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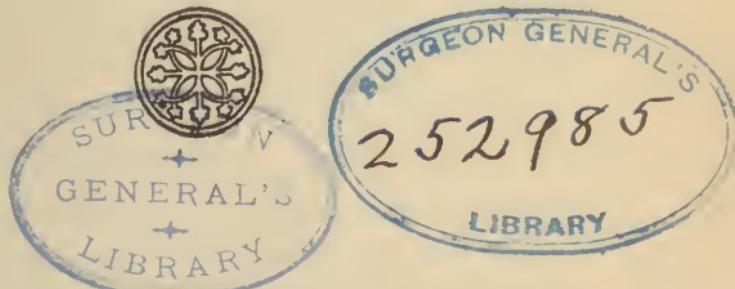


THE NATURAL DIET OF MAN

By

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PREFACE

This modest work is not intended to be a dissertation on practical dietetics nor an exhaustive inquiry into the problems of human feeding. The purpose of the author in its preparation has been to present a condensed summary of the main facts which bear upon the question of the natural diet of man.

This question must be admitted to be important, for more and more we have been in recent times finding out that after all Nature is the final authority in matters of fundamental consequence in relation to human life. Medieval philosophers dwelt in solitude and spun philosophies out of their inner consciousness; "pulled them out of their own stomachs," as they say in Burma. But the modern searcher for truth turns to Nature for wisdom and seeks knowledge through research, experiment, and investigation, employing every possible means of interrogating the forces of the natural world and of interpreting their manifold activities. And so this book attempts to find through an inquiry into

the facts and principles developed by modern laboratory research and clinical observation the answer to the question, What is the natural diet of man?

The few pages which comprise this little volume embody but a small part of the results of a life-long study of this subject, covering more than half a century. It has been the writer's earnest endeavor to follow implicitly the teaching of Nature in matters dietetic and by voice and pen to persuade others to do likewise. During this period the writer has watched with profound interest the new developments in chemistry and bacteriology, and especially in comparative anatomy and physiology, and with an eye directed to the discovery of anything scientifically unreconcilable with the principles of biologic eating as set forth in this little volume. It has been most gratifying not only to find no upsetting discovery brought forward but, on the contrary, to find in the developments of the new sciences of bacteriology and physiologic chemistry, as well as in the startling revelations of the nutrition laboratories of this country and Europe, the most striking and un-

qualified confirmation of every one of the principles of biologic eating.

After more than fifty years' personal experience with the fleshless diet and an unequalled opportunity to observe its effects upon both the well and the sick, the writer feels that he can say with full confidence that any reader who will make a careful study of the relation of meat-eating to intestinal toxemia or autointoxication, and will make even a brief trial of a well balanced and meatless bill of fare, will certainly be convinced of the immense advantages of the fleshless regimen and, in fact, of the impossibility of ridding one's self of the dangerous bacteria which infect the colon of every meat-eater and which give rise to colitis, appendicitis, and many other disorders (including headaches, high blood-pressure, arteriosclerosis, and even Bright's disease), by any method other than the exclusion of fish, flesh, and fowl from the bill of fare, and with them the putrefactive bacteria which butcher's meats always contain in countless millions.

The great attention being given in recent times to "changing the intestinal flora" has

clearly incriminated steaks, chops, sausage, and other favorite meats as the chief sources of the pernicious bacteria which swarm in the colons of mixed feeders. No positive headway can be made in changing the flora so long as meat is eaten.

Within the last twenty-five years great progress has been made not only in this country, but in most European countries as well, in the direction of a low protein dietary. Chittenden's notable and classic research clearly showed the fallacy of the Atwater standard and demonstrated the sufficiency of a protein intake one-third that called for by Atwater and his followers, whose guide was common usage, rather than demonstrated physiologic need. Chittenden's work practically eliminated meat. Although his research did not undertake to discriminate between the proteins of flesh and those of milk, eggs and vegetable foods, his standard left no room on the bill of fare for chops, steaks and roast beef, the staple forms of meat foods.

The experience of Germany, Denmark, and of most European countries during the World War afforded most convincing proof that

meat is non-essential, and the fact was recognized and put on record by the Inter-Allied Scientific Food Commission and other scientific bodies.

That the average citizen has taken note of the change in scientific opinion regarding the status of meat as a dietary staple is clearly shown by the fact that the per capita annual consumption of flesh foods has fallen from 225 pounds in 1902 to 170 pounds in 1921, a decline of 24 per cent. This fact has alarmed the meat packers, who have organized a vigorous and nation-wide "Eat-More-Meat" campaign. The gross misrepresentations of facts and misleading and alluring statements which are appearing in the daily papers throughout the country seem to make this an opportune moment for the presentation of the scientific facts set forth in the pages of this volume.

Hoping that this little treatise may be the means of convincing at least a few serious-minded persons of the disadvantages of a high protein or a meat dietary, thus enabling them to experience that marvelous physical and mental uplift which results from relieving the

body of the great handicap imposed upon it by the swarms of pernicious germs and the numerous virulent poisons always to be found in the colons of those who feed unbiologically, the writer presents this book as a contribution to the cause of race betterment, by which alone will it be possible successfully to combat the tide of race degeneracy which is rapidly sweeping on toward race extinction every civilized nation of the world. The reader who desires to pursue the subject further will find much interesting and corroborative data in Bell's *Regimen and Longevity*; *Le Vegetarianism*, by Bonnejoy; *Fruits and Farinacea*, by John Smith; *Thalysia*, by Gleizes; Plutarch's *Essay on Flesh-Eating*; and recent works by Chittenden and McCollum, and all standard works on human and animal physiology and comparative anatomy.

JOHN HARVEY KELLOGG.

March 1, 1923.

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MAN NOT NATURALLY A FLESH-EATER

It is to be noted at the outset that our present mode of life is far from natural. Since he left his primitive state, in his wanderings up and down the face of the earth to escape destruction by terrific terrestrial convulsions and cataclysmic changes in climate and temperature, chilled during long glacial periods, parched and blistered by tropic heats, starved and wasted by drouth and famine, man has been driven by ages of hardships and emergencies to adopt every imaginable expedient to survive immediate destruction, and in so doing has acquired so great a number of unnatural tastes, appetites, and habits, perversions and abnormalities in customs and modes of life, that it is the marvel of marvels that he still survives.

Man no longer seeks his food among the natural products of field and forest and prepares it at his own hearthstone, but receives it ready to eat, prepared in immense factories, slaughter-houses, mills, and bakeries and displayed in palatial emporiums. No longer led

by a natural instinct in the selection of his foodstuffs as were his remote forebears, he finds his dietetic guidance in the advertising columns of the morning paper, and eats not what Nature prepares for his sustenance but what his grocer, his butcher, and his baker find it most to their pecuniary interest to purvey to him. The average man himself no longer plants and tills and harvests the foods which enter into his bill of fare, that is, "earns his bread by the sweat of his brow," but accepts whatever is passed on to him by a long line of producers and purveyors who do his sweating for him, depriving him of the opportunity of earning both appetite and good digestion by honest toil. So he resorts to condiments and *ragouts*, palate-tickling and tongue-blistering sauces and nerve-rousing stimulants, as a means of securing the unearned felicity of gustatory enjoyment.

Modern Civilized Life Unnatural and Unbiologic

In man as we now find him there is little hint of naturalness or of primitive simplicity; he has become altogether perverted and is rapidly stumbling down the steep declivity of

race degeneracy. For knowledge of the ways and likings of our primitive ancestors of prehistoric times, we must glean such hints as we can from the fragmentary relics left by the millions who have lived before history began and by a study of the habits of man's near relatives of the animal world, who are still traveling the age-worn paths along which the *genus homo* plodded with them in the days when the race was young and possessed of those guiding instincts with which all animals except man are still endowed, but which civilized man, as well as some domesticated animals, has largely, if not wholly, lost. Says a recent scientific writer (Professor T. D. A. Cockerell) in the *Journal of the American Museum of Natural History*:

The gains of science and democracy have been enormous. Nevertheless, we are discontented and unsettled, deeply disappointed with the results of so much intelligent labor. We even look with a kind of envy at the naked savage, living a simple life in the primitive forest. He at least knows how to behave, and has little to regret. This is not mere meaningless sentiment: it is actually a fact that the average man is less accurately adjusted to his environment than most wild animals. We have created an enormously complex machinery which we do not know how to operate quite successfully.

Animal Dietaries

Comparative anatomy and natural history give definite and positive information. It is easy to determine the natural diet of an animal by studying its eating habits when in a wild or natural state, because animals are guided by unerring instincts which instruct them as to what to eat and lead them to avoid those things which are not naturally adapted for their sustenance, and which are hence unwholesome for them. In the feeding of wild animals in captivity and even in the feeding of domestic animals, man recognizes the imperative importance of these natural or instinctive guides and seeks by careful study, experiment, and observation to ascertain what is the *natural* diet of each species.

The experienced stockman is highly educated on the subject of animal dietaries. He knows exactly how to feed a horse so as to produce the largest, strongest, healthiest, and most efficient animal. He knows how to feed a pig in such a way as to secure the greatest growth in the shortest length of time and at the lowest cost. He knows how to feed cows

so as to produce the largest amount of milk and milk of the desired quality, and how to feed hens so as to secure the largest production of eggs. He has secured this knowledge by long, laborious effort, observation, and experiment. But with reference to the feeding of himself or the members of his family, the average stock man is lamentably ignorant.

Some years ago the writer, when talking with a bright country boy of eight or nine years, learned that the lad was the owner of several rabbits and the following conversation ensued:

Writer.—"What do you feed your rabbits?"

Boy.—"Grass, lettuce, potatoes—almost anything."

Writer.—"How much meat do you give them?"

Boy.—"I don't give them any meat."

Writer.—"But you give them a bone once in a while, don't you?"

Boy.—"No, indeed. I never give them meat or bones."

Writer.—"Why not?"

Boy.—"Rabbits won't eat meat. Dogs gnaw bones, but rabbits don't."

Writer.—"But why won't rabbits eat meat?"

Boy.—"Because it ain't good for them, of course."

Writer.—"Then rabbits know what is good for them to eat, do they?"

Boy.—"Of course they do."

Writer.—"Do you know what is good for you to eat?"

Boy.—"Well, no, I don't believe I do."

Writer.—"Does your father know what is good to eat?"
Boy.—"I'm sure Dad don't know because he said the other day he had ate something that hurt him, but he didn't know what it was."

Even the small boy recognizes his inferiority to the lower animals in the knowledge of dietetics.

Man has existed for so long a time under unnatural conditions of life that he has lost his instinctive guides, and instead of eating those things that belong to his particular class he has acquired artificial tastes and appetites which lead him to eat almost everything that any animal eats, including many things which the more intelligent animals positively refuse unless pressed by extreme hunger. In fact, some things which are a part of the daily bill of fare of the average civilized man, condiments, for example, most intelligent animals and millions of uncivilized men would absolutely refuse.

Lessons from the Monkey

Even savage man finds it necessary to appeal to his humble forest companions for information regarding foods with which he is not acquainted. Dr. Geil, a famous African ex-

plorer who visited the pygmies, told the writer some years ago that when he asked the chief of the pygmies, "How do you know what to eat when you visit a new forest?" the quaint little chieftain replied: "When I find a new nut, I put it where a monkey can see it; then I hide and watch the monkey. Pretty soon he picks up the nut, smells it, tastes it, and then if he eats it, I eat it. If he drops it on the ground, I know it is poisonous and don't eat it."

The pygmy has made an important dietetic discovery which the average civilized man has not yet attained. He has found that the safe way in diet is to follow the monkey. He submits his bill of fare to his forest relative, whose knowledge of dietetics he knows to be more reliable than his own, and accepts his guidance. We are gradually finding out that the instinct possessed by creatures which have not been perverted by the caprices of misguided intelligence or the compulsion of adversity or emergency is infinitely wiser and safer as a source of dietetic guidance than human intelligence. Much more valuable information could be obtained by sitting at the

feet of some wise old chimpanzee and watching him eat than by reading many books on dietetics.

Porcine Wisdom in Diet

Even a stupid pig knows more about dietetics than the average college professor. This was proven some years ago through an experiment made by Professor Evvard, of the Iowa Agricultural Experiment Station. Ordinarily the pig does not have a chance to choose his food, but is expected to eat any sort of rubbish that is thrown to him. It occurred to the professor to give the pig a chance to select his food, placing before him in simple, unmixed form, all the different things that the animal needs, permitting him to make his own selection and to do the mixing, even relying upon the pig's judgment to determine the quantity needed to satisfy his requirements. The result was the finest porkers ever seen. The professor, himself an expert pig dietitian, confessed that the pig had excelled him as a caterer. Professors Osborne and Mendel repeated the experiments with rats, with like results.

There is no longer room for doubt. *Nature knows*, but man has so long closed his ears to Nature's infinitely wise guiding admonitions that he has become deaf to her counsels. He can no longer hear her instructions and wanders about in a maze of ignorance, falling into bottomless abysses of mishap and misadventure, ever sinking to lower levels of depravity and degeneracy in matters dietetic, until he has become a veritable Cyclops, the devourer of all devourers, the most misguided and denatured of all living creatures.

Animals Classified by Diet

The zoologists have divided the animal world into families and classes, basing their classification upon structural relationships. So closely dependent is function upon structure that the animals thus grouped together are found to possess certain natural characteristics in their habits, particularly in relation to diet. For example, the various members of the horse family—donkeys, mules, zebras, horses—all follow the same bill of fare. If a new horse were discovered, there would be no question as to what it should be fed. It

would be expected as a matter of course that he would eat the same food as other horses. No one would think of trying experiments upon him to see whether or not he would prefer to eat beefsteaks or fish or eggs or bologna sausage. All the ruminants eat grass, and all the felines are meat-eaters. No one would think of feeding corn or twigs to a newly-discovered cat or tossing a bone to a new sheep. Since man can nowhere be found in a really natural state, our only means of finding an answer to the question, "What is man's natural bill of fare?" is to ascertain, if we can, to which one of the various biologic families he belongs; then, from our knowledge of the eating habits of kindred animals, we may ascertain what is his proper bill of fare. Fortunately, no room is left for conjecture upon this subject, for scientists are unanimous in placing man in the very clearly defined, as well as very old and very respectable, family of animals known as *primates*. Modern man is a very old-fashioned animal, but he is trying to live in an altogether new and unbiologic manner such as no primate or any other animal ever before adventured.

The Ancient Family of Primates

One of the chief characteristics of this ancient family is the possession of hands. Every member of this family has hands with five digits and feet with five toes; with arm bones, leg bones, pelvic bones, spinal column, skull bones, and teeth, all closely resembling those of man. And the resemblance is not simply in the shape of the bony structures; there is a wonderful likeness and unity of plan in the structure of brain, stomach, intestines, liver, heart, lungs, kidneys, nerves, and muscles and in their functions.

Now let us inquire, what do primates eat? The primates are fruit and nut eaters always, no matter where they are found. All the primates adhere to this family bill of fare. The gorilla, reigning king of beasts in the forests of the Congo, his somewhat lesser relative, the chimpanzee, who tenants a wide area of the Dark Continent, the orang-utan of Borneo, and the gibbon of tropical Asia, diversified as they are in form and habitat, are all equally circumspect in their adherence to the diet of nuts and fruits, tender shoots and

soft grains—foods which Nature has prescribed as the primate's bill of fare.

These facts are well known. In the London Zoo and in every other large zoological collection there are to be found great numbers of anthropoids of different species which are being fed, not after the manner of their renegade relative, man, but in accordance with the eating habits of their remote ancestors together with the ancestors of the human race.

When visiting the London Zoo many years ago, the writer asked of the keeper, "What do you feed your apes?"

He said, "Come into my pantry and see."

In the pantry we found a fine assortment of cereals, fruits and vegetables with milk and nuts, the very things in fact which constitute the staples of our own dietary.

"Do you never give your monkeys meat?"

"No, indeed," said the keeper, "meat is not good for monkeys and apes; it is not their natural diet."

From the foregoing facts it would seem unnecessary to pursue our inquiry further, as there can be no room for question that man is a



Herr Umlauß
SKELETON OF MAN AND GORILLA



Herr Umlauß
THE GORILLA, THE KING OF THE
CONGO FORESTS
Has the Strength of Ten Men.



CHIMPANZEE



Herr Carl Hagenbeck

YOUNG CHIMPANZEE AND ORANGUTAN

primate and that he alone of all the primates now living or who have lived in ages past is an eater of meat; but in order that there may be left no room for doubt we shall consider the subject further in its various bearings.

All Mammals Originally Vegetable Feeders

It is interesting in this connection to note the fact brought out by Professor Elliot, the noted English zoologist, who in his recent work, *Prehistoric Man*, tells us that in the Eocene period, when the earliest forerunners of the human race made their appearance, not only those primitive "lemur-monkey-men" were fruit and nut eaters, but that *all mammals adhered to the same bloodless fare*. Says Professor Elliot:

On the bushes by the rivers and along the shore there were all sorts of fruits and nuts. For the subsistence of our lemur-monkey-man in the early stages of evolution, what fruits would seem *a priori* most suitable?

I think that one would select the banana and breadfruit. Ancestral forms of both were flourishing in the Eocene. Many other fruits with which man has been afterwards continually (perhaps one might venture to say *most intimately*) associated occur at this period. These are, most of them, found in so many places that one is apt to think they were then of world-wide distribution.

In the temperate brushwood and on the river-sides, acorns, hazel-nut, hawthorn, sloe, cherry, and plum might be found. Here and there he might alight upon a walnut or almond; figs also of one kind or another seem to have been common. Palm trees existed, and some of them were of enormous size.

Birds, who had not yet learnt any special fear of mankind, would nest in the bushes and roost in the branches.

Moreover, there was not, so far as we are aware, any carnivorous creature in the Eocene period, or one which might have been a serious enemy.

This remarkable statement shows us that the modern primate in avoiding meats is simply adhering to the bill of fare originally common to all mammals when land animals were nourished by the products of the vegetable kingdom. Lions, wolves, and other carnivorous animals represent renegade and degenerate tribes or races which, through the scarcity of their natural food or other compelling circumstances, have been led to abandon their original primitive diet and to adopt eating habits wholly foreign to their primitive progenitors of Eocene times.

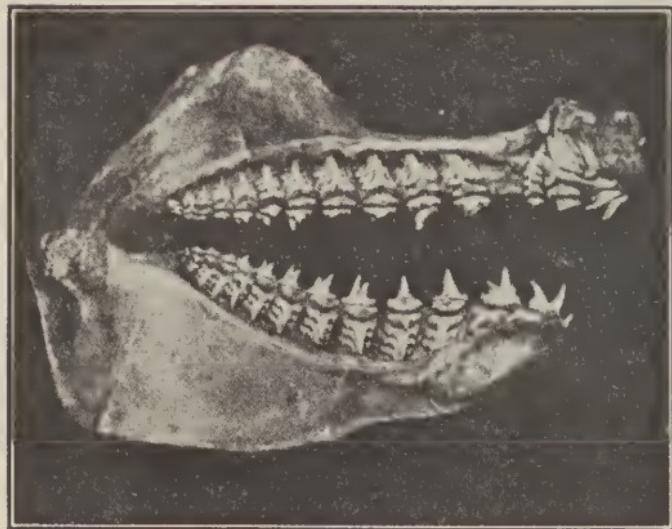
The eminent Italian anthropologist, Giuffrida-Ruggeri, calls attention to the taurodontism of the Heidelberg teeth, shown in the accompanying cut, one of the most interesting



HEIDELBURG JAW



JAWS AND TEETH OF LION



JAWS AND TEETH OF SHARK
CARNIVOROUS TEETH

relics of very ancient man yet discovered. According to Sir Arthur Keith, the eminent English anatomist, the taurodontism of prehistoric man, that is, the special form and structure of the teeth of these early races, indicates that they were non-flesh-eaters. Sir Arthur Keith evidently believes the natural or primitive diet of man to be the same as that of other members of the great family of primates.

Professor H. M. Ami, of Montreal, author of the *Geography of North America*, a geologist and paleontologist of world-wide renown who has given great attention to the study of prehistoric man, assures the writer that the diet of the human race in its earliest history did not include flesh in any form. According to Professor Ami, all paleontologists agree that man did not become a flesh eater until after the arrival of the Glacial Period, when the great forests of nut trees and wild fruits which had previously constituted his chief food resources were destroyed by the great ice cap which crept down over the northern hemisphere and compelled those who did not migrate to the south to seek shelter in caves.

Professor Ami also, in a recent address, called attention to the interesting fact that in recent times there is a marked tendency to return to the natural and primitive diet, as shown by the falling off in the per capita consumption of meat in the United States, which has dropped from 225 pounds in 1902 to 170 pounds in 1922, a decline of 55 pounds, or 24 per cent.

The dim memory of this happy time when no bloodthirsty animal roamed the face of the earth and when all the world was at peace is preserved in legends and traditions about "The Golden Age," when, as Ovid sings, men

"Fed on fruit,
Nor durst with bloody meats their mouths pollute."

It is interesting to note that the same geological strata in which the earliest indications of primitive man appear give evidence of the existence at that same period of enormous forests of nut pines and other nut-bearing trees. Says Henry S. Graves, of the United States Forest Service, in the *Mentor* for June, 1918:

"To primitive man the forest furnished

both food and a home. Later, when he had become a meat-eater, man left the forest for the treeless plains, where he found in abundance the animals upon which he preyed." Flesh-eating was, then, an acquired practice which was the result of man's (probably forced) departure from his original native home, where his natural foodstuffs were provided ready at hand in great abundance.

It is entirely possible that if all the early representatives of the human race had migrated to the south, as the chimpanzee, gorilla and other primates seem to have done, man might, like the latter, have adhered to the original bill of fare. In fact, the majority of dwellers in tropical regions are at the present day still users of meat only to a very limited degree. The per capita consumption of flesh foods even by the Japanese, who live in a comparatively cold climate, is only four pounds a year, or about one ounce a week.

It is evident that so far as man has become an eater of flesh he has followed the example of degenerate and predatory beasts, creatures that are far removed from him in structure and wholly outside his biologic class, instead

of following the example of his nearest relatives in the animal kingdom, members of the same biologic group, the wonderful primates, the most intelligent and most human-like of all existing animal forms.

When Germ Diseases Were Unknown

At this early period, when primitive men then existing (as well as practically all other animals) still derived their sustenance from the products of the soil, disease was unknown. Professor Roy L. Moodie, of the University of Illinois, tells us that even injuries to bones were not followed by attacks by germs:

The early animals were so highly immune to attack by bacterial organisms that it was only after the races of animals began to grow weaker through age that disease was able to make any headway. . . . Disease was not present in the earliest times of the earth's history, and it did not become very active until the present age of the earth had been attained by nearly three-quarters of its duration. That is, disease has only been active during the last one-quarter of the earth's history, so far as mammals and birds are concerned. The incidence of maladies began slowly, was introduced gradually, and has been an important factor only within relatively recent times. Only when racial old age and the introduction of other antagonistic influences disturbed this natural immunity did animals see the new factor of disease enter into their lives.

It thus appears that the testimony of science is that disease is the penalty of wrong doing, the result of departure from the simple ways of our prehistoric forebears. The only hope for the race to escape from the frightful penalties of unnatural living is to return so far as possible to simple, natural living—in other words, to learn to live biologically.

The Kinship of Higher Apes and Men

According to Nuttal, blood tests show that of all species of animals the anthropoid apes are the most closely allied to man. This test, indeed, shows a very close kinship between man and these other members of the family of primates. Says Fitch: "The great apes feed, on the whole, in the same way as the monkeys. They are chiefly frugivorous, subsisting on a vegetable diet in concentrated forms, and are animal feeders to a small extent, when vegetable food is difficult to procure. In addition to the forms of vegetable food eaten by monkeys, the great apes will, in stress of circumstance, devour rats, mice, and other small animals and even birds."

The adaptation of the teeth to a vegetable

diet is shown by the numerous cusps (five or six) presented by the molar teeth of the chimpanzee. The molars of the negro and the native Tasmanian have the same number of cusps, although highly civilized members of the *genus homo* now possess but four cusps because of disuse of the teeth brought about by the habitual use of soft food, which has led to a decrease in the size and length of the teeth as well as the size of the jaw, and is without doubt a strong factor in the prevalent decay of the teeth among civilized nations.

It cannot be denied that, while the slaughter of animals and their preparation for food are offensive to refined human instincts, the very opposite is true with reference to the varied operations of agriculture by which the earth is made to yield its wholesome fruits. What is more delightful than the gathering and eating of nuts and fruits?

Man is naturally neither a hunter nor a killer. Carnivorous animals are provided with teeth and claws with which to seize, rend, and devour their prey. Man possesses no such instruments of destruction and is less well qualified for hunting than is a horse or a

buffalo. When a man goes hunting, he must take a dog along to find the game for him, and must carry a gun with which to kill his victim after it has been found. Nature has not equipped him for hunting.

Every child must be taught the use of flesh before he becomes a flesh-eater. Raw flesh, the diet of carnivorous animals, is as repugnant to a man who has not acquired the taste as to an orang-utan or a chimpanzee. A two-year-old child will seize a peach or a plum and eat it at once, without being influenced by persuasion or example; but no amount of persuasion could induce an intelligent two-year-old child to catch and eat a grasshopper, a mouse, or a butterfly, or to eat a bit of raw meat. The extreme dislike which some adults and most infants exhibit toward flesh food of any sort is attributed by Fitch to an "atavistic tendency," that is, the survival of the primitive human instinct.

Flesh-Eating Never a Universal Custom

The human race in general has never really adopted flesh as a staple food. The Anglo-Saxons and a few savage tribes are

about the only flesh-eating people. The people of other nations use meat only as a luxury or an emergency diet. According to Mori, the Japanese peasant of the interior is almost an exclusive vegetarian. He eats fish once or twice a month and meat once or twice a year. Throughout the Island Empire, rice is largely used, together with buckwheat, barley, wheat, and millet. Turnips and radishes, yams and sweet potatoes are freely used, also cucumbers, pumpkins, and squashes. The soy bean is held in high esteem and used largely in the form of *miso*, a purée prepared from the bean and fermented; also *to-fu*, a sort of cheese; and *cho-yu*, which is prepared by mixing the pulverized beans with wheat flour, salt, and water and fermenting from one and a half to five years. The Chinese peasant lives on essentially the same diet, as do also the Siamese, the Koreans, and most other Oriental peoples. Three-fourths of the world's population eat so little meat that it cannot be regarded as anything more than an incidental factor in their bill of fare.

Among primitive people, meat is often eaten for other reasons than the satisfaction of

hunger. The Maori eats the flesh of a slaughtered enemy in order to become possessed of his courage and strength. The people of lower Nubia, in like manner, eat the fox with the idea that in so doing they may become possessed of his cunning. In upper Egypt the heart of the hoopoe bird is eaten to acquire the ability to become a clever scribe. The bird is caught and its heart is torn out and eaten while still alive.

Even the savage recognizes the inferiority of flesh as a diet. Anthony tells us (*Natural History*) that among the Jivaro Indians of Ecuador, "one who has recently killed an enemy avoids meat, confining himself to a vegetable diet. The reason given is that if he consumed meat, he would be easily surprised and killed by the friends of the man he had slain, whereas if he ate vegetables he would be hard to surprise."

That flesh food is not the natural diet of man is shown by the fact that it is seldom eaten in its raw state. And cookery seems to be more than a means of catering to the gustatory sense, for Laroche has shown that raw meats

sons are susceptible and which are destroyed by heat, another significant fact showing that meat cannot be naturally designed for human food.

But cookery is no part of Nature's biologic scheme, and hence the fact that man is able to eat and digest cooked meat is no more evidence that he is carnivorous or omnivorous than the fact that he can eat and digest cooked corn is evidence that he is to be classed with graminivorous animals, like the horse, which are eaters of raw grains.

The bill of fare which wise Nature provides for man in forest and meadow, orchard and garden, a rich and varied menu, comprises more than 600 edible fruits, 100 cereals, 200 nuts, and 300 vegetables—roots, stems, buds, leaves and flowers—to say nothing of eggs, milk and various other dairy products. Fruits and nuts, many vegetables—young shoots, succulent roots, and fresh green leaves—and all dairy products, are furnished by Nature ready for man's use.

TWENTY POPULAR DELUSIONS ABOUT FLESH FOODS

The popularity of flesh as an article of diet is doubtless due to numerous deeply-seated errors which have so long existed in the public mind that their validity is taken for granted when, as a matter of fact, they have no scientific foundation. Unfortunately, these popular notions are based not upon scientific observations or experiments but upon preconceived opinion and prevalent custom. At the present time these false ideas are being actively fostered and propagated for the promotion of the financial interests of the live-stock and packing industries. Here are a few of these antique fallacies:

Delusion 1. That meat is superior as a blood-making food, and hence is needed in anemia.

Modern investigations have shown that the food iron furnished by green leaves and other vegetable products is more rapidly assimil-

able than is the hemoglobin, or blood iron, found in raw meats.

When the writer was a medical student, more than forty years ago, it was the custom of physicians to recommend to their patients suffering from pernicious anemia the drinking of blood warm from the cut throat of the ox. In many large abattoirs at that time a long row of seats close to the slaughtering pen was filled every morning with pale-faced patients waiting to quaff the warm blood of the dying ox. Although it was soon discovered that, plausible as the theory seemed, it was not verified by fact, so that the practice of blood-drinking soon fell into disuse, the blood of the ox under various names and guises is still being industriously exploited by nostrum venders as a panacea for impoverished blood.

The ox gets its red blood from the green grass; and the green leaf, rich in vitamins and food lime as well as food iron, is unquestionably the most valuable source of iron for the anemic invalid. It is now known that such inexpensive foodstuffs as greens and fresh vegetables not only contain more iron than

does the finest beefsteak, but better food iron than is found in meats of any sort. Dr. Sherman, of Columbia University, in his *Chemistry of Foods*, calls attention to the fact that the iron of meat is not superior but rather inferior to the iron found in vegetables; so meat can no longer be held on scientific grounds to be a specially valuable food for persons suffering with anemia.

The facts of human physiology clearly show the reason for the inferiority of blood iron. The need for iron in the food grows out of the loss of iron due to the constant destruction of blood cells in the body. This destruction takes place in the spleen and the liver. The liver retains and uses in making new blood cells as much of the iron of the dead cells as can be employed in this way. The balance is excreted by the intestine. The iron of meat is wholly derived from the dead blood which it contains and may not appropriately be called "junk iron." It is evidently less valuable than the original food iron; otherwise the body would need no other iron supply than that of its own dead cells, and would retain this iron instead of excreting it.

Persons who need an increase of blood corpuscles, and hence require an extra supply of iron, should eat greens instead of meats. Spinach, lettuce, beet tops, turnip tops, greens of all kinds, should be used plentifully. Dates, figs, and raisins contain, per ounce, more food iron than does ordinary beefsteak. *A slice of graham bread (one ounce) contains as much iron as the same weight of beefsteak. Bran contains three times as much iron as does average meat.* More than twenty common vegetable foodstuffs are richer in food iron than is flesh meat, and the iron is of better quality (Sherman).

Anemic persons may not only discard meats with safety but with great benefit, for certain germs found in meat and the germs which are encouraged to grow by the presence of undigested meat residues in the colon are a well-known cause of anemia, because the poisons which they produce destroy the red blood cells (Herter).

This is doubtless the explanation of the fact that flesh-eating animals are much more subject to anemia than are grass- and grain-eating animals. A non-flesh diet discourages the de-

velopment of these germs in the colon, and is favorable to enrichment of the blood through the absorption of the abundant supplies of food iron found in many vegetable foods. A handful of garden greens, even of such common weeds as purslane, pigweed, or dandelion, contains as much iron as the same weight of beefsteak, while mustard greens, red-root, and dock contain more than twice as much. *Egg yolk contains four times as much iron as the same weight of beefsteak and better iron.*

Evidently anemic persons do not need to eat meat to secure iron for blood-building.

Delusion 2. That meat is essential as a flesh-building food.

Here, again, experience and laboratory research have exposed a popular fallacy. Carbohydrates (starch and sugar) and fats are known to be the flesh-builders rather than meat. Of course, a certain amount of protein is required for building up muscular tissue, but the amount that can be so used daily is very small and may be obtained from milk and eggs or even from purely vegetable sources, as nuts and grains.

Meat-eating does not promote strength. The strongest animals in the world, the elephant, the rhinoceros, the hippopotamus, the camel, are all vegetable feeders. The giant sloth, the megatherium, the mammoth, and most of the huge reptiles, the mightiest beasts which ever roamed the surface of the earth, were plant feeders.

Milo, a disciple of Pythagoras, whose mighty prowess is still remembered after more than twenty centuries, was, like his master, a flesh-abstainer. The athletes of ancient Greece and the gladiators of ancient Rome were trained on barley cakes and wheat.

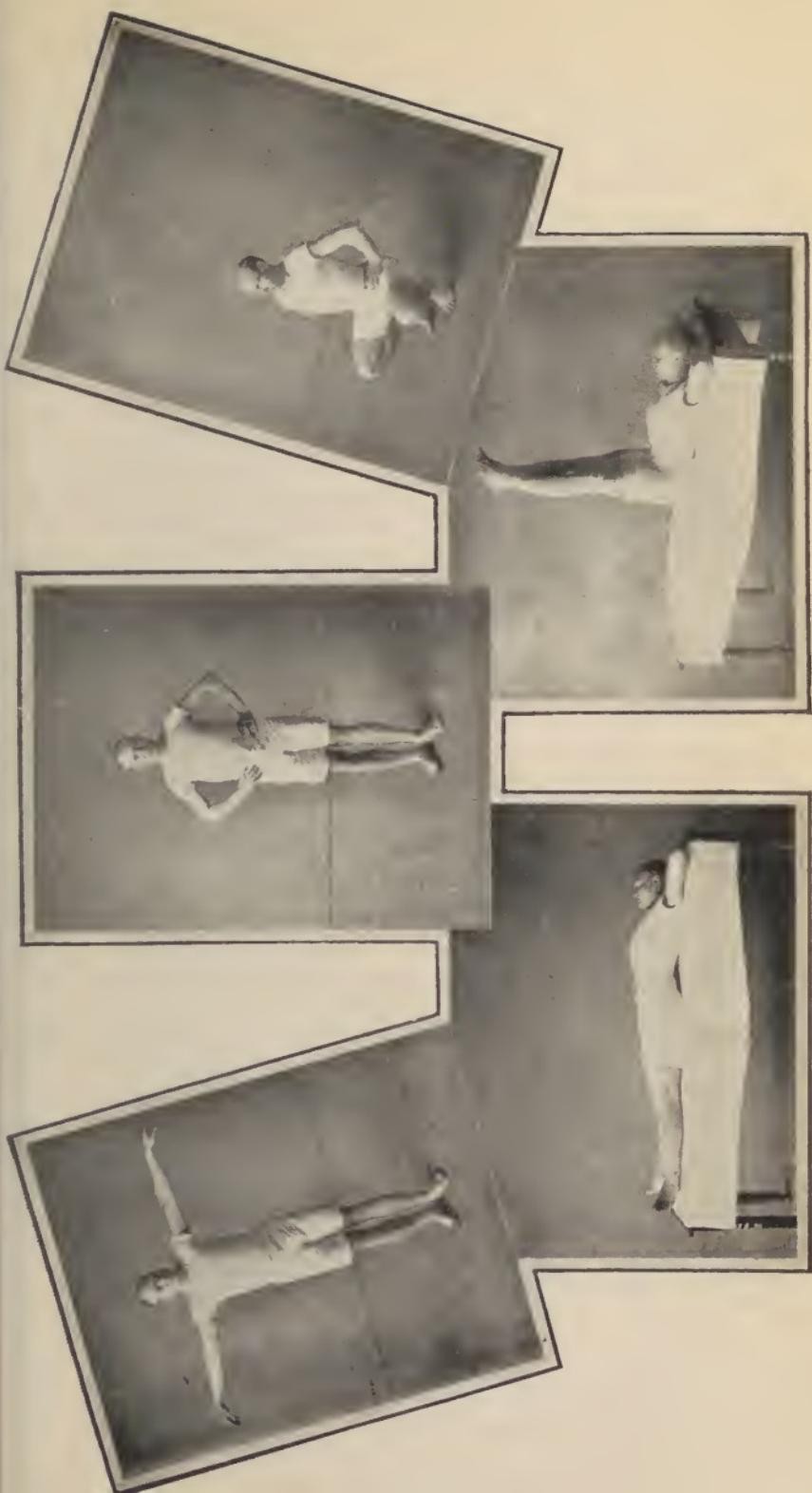
Delusion 3. That a flesh diet is essential to support severe or prolonged activity; that is, promotes endurance.

Some years ago Professor Irving Fisher, of Yale University, made a careful scientific research upon this subject with most decisive results. We quote as follows from his paper, "The Influence of Flesh-Eating on Endurance," which was published in the *Yale Medical Journal* for March, 1907:

The first comparison (for arm holding) shows a great superiority on the side of the flesh-abstainers. Even the *max-*

PROF. IRVING FISHER'S ENDURANCE TESTS

The flesh-abstainers excelled flesh-eaters by more than 100 per cent.





A HINDU HERCULES LIFTING A MILL STONE



A HAMAL (PORTER) WHO OFTEN CARRIES
WEIGHTS OF 700 POUNDS

imum record of the flesh-eaters was barely more than half the average for the flesh-abstainers. Only two of the fifteen flesh-eaters succeeded in holding their arms out over a quarter of an hour; whereas 22 of the 32 abstainers surpassed that limit. None of the flesh-abstainers reached half an hour, but fifteen of the 32 abstainers exceeded that limit. Of these, nine exceeded an hour, four exceeded two hours, and one exceeded three hours.

In an article in *Munsey's Magazine*, Professor Fisher further says with reference to this experiment:

The flesh-eaters were largely men in training for athletic contests at Yale; the abstainers were such Yale students as I could find who did not use meat, or used it very sparingly, and nurses and physicians of the Battle Creek Sanitarium. . .

One of the most severe tests was in deep knee-bending, or "squatting." Few of the meat-eaters could "squat more than three hundred to four hundred times, and it was almost impossible for them to walk down the gymnasium stairs after the test, without falling, so weakened were their thigh muscles. On the other hand, one of the Yale students who had been a flesh-abstainer for two years did the deep knee-bending eighteen hundred times without exhaustion, after which he ran without difficulty on the gymnasium track and walked several miles. Another subject, a nurse at the Battle Creek Sanitarium, did the deep knee-bending twenty-four hundred times; after which he proceeded with his regular work without serious inconvenience. Another nurse has recently accomplished the surprising record of five thousand times. One remarkable difference between the two sets of men was the comparative absence of soreness in the muscles of the meat-abstainers after their tests.

The average time of the fifteen flesh-eaters in the arm holding experiment was ten min-

utes; that of fifteen flesh-abstainers, eighty-nine minutes, or *nine times as long*. The flesh-abstainers were ahead in all the tests. It is to be remembered, also, that most of the flesh-abstainers were sedentary men with no physical training, while all the flesh-eaters were selected athletes in training for contests.

Evidently flesh-eating does not contribute to endurance, when it appears that a group of men without athletic training, but flesh-abstainers, are able to outdo a similar group of trained athletes in the ratio of nine to one.

Quite in agreement with the observations of Professor Fisher are those made by De-Lesseps (page 48), Fauvel (page 194), Baèltz (page 196) and others.

It is perfectly true that persons who simply discard meat without making any other change in their diet not infrequently suffer a notable loss of strength and fitness. The writer has known such cases. In former times the cause of this effect of flesh-abstaining was obscure, and the fact certainly was a cloud upon the philosophy of the fleshless diet. Nobody could say just how the untoward re-

sults of flesh-abstinence could be certainly avoided. But, happily, we are no longer in the dark on this point. The animal feeding experiments of McCollum, Mendel, Osborne, and other investigators, as well as researches carried on in the nutrition laboratories of the Battle Creek Sanitarium under the writer's supervision, have shown that the bad results which seem to follow the withdrawal of meat from the dietary are not due to the lack of meat *per se*, but to the *lack of complete proteins*. Fortunately, these proteins are found in abundance in milk and eggs as well as in most nuts, peanuts and the soy bean, although deficient in cereals, vegetables, and fruits, the foods which have generally made up the bulk of the strictly vegetable bill of fare. When dairy products or eggs in moderate quantity are included in the bill of fare, meat is not missed. This has been demonstrated at the Battle Creek Sanitarium in the feeding of more than 250,000 persons on a fleshless bill of fare, an experience extending over more than fifty years.

It is instructive, in this connection, to note that carnivorous animals are greatly inferior

in endurance to the non-flesh-eating. Theodore Roosevelt observed that a horse with a heavy man on his back could, in a mile and a half, ride down a lion fleeing for his life. This observation agrees with the fact that the world's records for endurance in long distance running and other feats are held by flesh-abstainers. A Tarahumara Indian carried a message over a trackless mountainous country three hundred miles and back in five days on a diet of parched corn and water (Hewitt). The famous pedestrian, Weston, informed the writer that he never eats meat when on a walking tour.

Says Professor Irving Fisher of Yale University in *How to Live*: "We have it on the authority of one of our Hygiene Reference Board members that to his personal knowledge a South African savage who never touched meat ran more than one hundred miles in twenty-four hours and was none the worse for it. This man was very brave and would unhesitatingly attack a lion. He certainly did not lack 'pep'."

According to the *Boston Herald*, quoting from the *Statesman*, of Calcutta, a certain

Rama Murti Naidu, a native Hindu, whose diet consisted of rice, peas, greens, almonds, wheat, butter, cream, and honey, was at that time performing most astonishing feats of strength and endurance. This Hercules was then twenty-nine years old. He lay down and a twelve-horse-power motor car ran over his back and shoulders. A stone weighing a ton and a half was placed upon his chest and another large rock put upon this and broken with a sledge hammer.

Is there a flesh-eater of any nationality who would undertake to repeat the performance of this Hindu vegetarian?

Hunters increase the endurance of their dogs by withholding meat. The famous fox hounds of the Southern states are trained without flesh. Performing dogs are never fed flesh. The dog, though by nature carnivorous, is a better dog when he becomes a flesh-abstainer, which fact is ground for the belief that the dog, and perhaps all carnivorous animals, have become meat-eaters only by dire necessity and not by choice or with any advantage to themselves. Flesh-eating animals are in general short-lived.

The Arab laborers who constructed the Suez Canal lived upon wheat and dates; and De Lesseps, the great engineer who projected and successfully completed this remarkable work, was so impressed by observing the superiority of the wheat-fed Arabs over the beef-fed Englishmen engaged in the same work that he became a flesh-abstainer and an earnest advocate of the fleshless regimen, and continued so until his death many years later.

Italian laborers, Irish laborers, in fact, the peasantry of all countries, including those of the populous regions of India, Japan, Siam, and Central Africa, are practically vegetarians. The reason why American workingmen when engaged in hard labor use a considerable amount of meat is that meat is a part of their ordinary diet. When the laboring man has hard work to do his appetite increases and he naturally increases the quantity he eats, not simply as regards meat but with reference to all the foodstuffs which make up his bill of fare. He simply eats more of everything which he ordinarily eats not knowing that his increased energy output calls for an increase of carbohydrates and fats rather than an in-

crease of protein. When the scientific facts relating to human nutrition are made as familiar to the average schoolboy as are the rules of arithmetic, the workman will be better advised; and when hard work is required of him he will increase his consumption of bread, potatoes, and fats, instead of increasing his protein intake. Science has clearly shown that protein is a far less economical source of energy than fat and carbohydrates. In this all modern physiologists agree.

Delusion 4. That flesh-eating is necessary to produce physical courage.

Unquestionably the practice of flesh-eating does tend to develop the killing instinct and to deaden the finer humane instincts; but it must be noted that ferocity and courage are by no means identical qualities. Most carnivorous animals hunt their prey by night and capture their victims by cunning, with little exhibition of courage. More than this, the carnivora always attack weaker and comparatively defenseless animals. Who ever heard of a forest combat between a lion and a tiger or a leopard? The lion is bold enough in the

presence of a feeble antagonist, but slinks away into the thicket when a vegetarian rhino appears in sight.

It has long been known that tame bears, while not of a ferocious disposition, sometimes become unmanageable when fed raw meat. Dr. Harry Campbell, a prominent London physician, believes that man's character has been changed by flesh-eating. He says:

The fact that carnivorousness makes for ferocity and develops the fighting instinct has this interest—that man is himself carnivorous. (?) Indeed, in the matter of slaughter, he leaves all other animals far behind. He is the arch slaughterer—*facile princeps*. Since the time the pre-human ape took to hunting he and his human descendants have wrought ruthless havoc among the lower animals, and at the present day man not only hunts them, but breeds them for the express purpose of destroying them, chiefly for food, partly for amusement. Many a person of gentle nature would be amazed and horrified were he at the end of a long life to see *en masse* the hecatombs of living things done to death on his behalf.

Delusion 5. That vegetarian races are inferior physically and mentally to races taking a mixed diet.

Unquestionably there can be found some vegetarian races who are inferior to some flesh-eating nations. On the other hand, there are plenty of examples of tribes or nations

living upon a flesh or mixed diet who are inferior to other nations not strictly flesh-abstainers. In making comparisons of this sort it is important to take into account the influence of heredity, climate, social and political conditions, and other factors which profoundly influence both physical and intellectual development. For a fair comparison it is necessary to contrast flesh-eaters and flesh-abstainers who are living under identical conditions. When such a comparison is made, the findings certainly do not support the above statement.

Take for example India, where we find a subject race numbering 300,000,000 people held under control by an army of occupation consisting of less than 100,000 beef-fed British soldiers. We are told that this fact proves the inferiority of vegetarians. Those who offer this argument overlook the fact that there are among the 300,000,000 natives of India 100,000,000 Mohammedans who, like the British soldiers, are meat-eaters, their religious scruples placing no dietetical restrictions on them to prevent the free use of meat. So the meat-eating British army of

100,000 holds in subjection not only 200,000,-000 rice eaters but also 100,000,000 *meat-eaters!* In other words, according to this argument one British soldier is equal not only to 2,000 rice-eaters but, in addition, to 1,000 East Indian meat-eaters. Evidently there must be in operation some factor other than that of diet.

It is perfectly true that there are in India many millions of rice-eaters who are inferior physically and intellectually to the average mixed feeder of European countries; but the real cause is to be found not in the fact that the East Indian does not have meat to eat, but in the fact that he does not have enough of anything to eat. He is half starved. A man who receives as his reward for a long and arduous day's labor the small sum of five cents, and with this pittance must feed and clothe himself, his wife, and a family of two to half a dozen children, cannot possibly procure food enough of any sort to maintain his body in good physical condition. A hundred years or more of such experience must naturally show, among other results, evidences of national physical decadence.

But we must not forget that the strictest flesh-abstainers in India are the Brahmins, who are at the same time the most vigorous and the most highly developed physically and mentally, of all the people of India. These men, who for more than two thousand years have been flesh-abstainers, show no evidence of physical deterioration and are in no whit inferior mentally or physically to mixed feeders in any part of the world. Indeed, young Brahmins have not infrequently been found among the prize winners in English and American universities. As philosophers, linguists, and logicians, they are acknowledged to be the compeers of any men who live in any part of the world; and, taken as a class, might even outrank in physical and mental development an equal number of average Europeans.

It must be remembered, also, that hook-worm disease is very prevalent in most parts of India, and is no doubt responsible for the low physical state of large populations.

Finally, it is to be noted that, although it is true that flesh-eating men are naturally more ferocious and war-like while non-flesh-

eaters are more peaceful and gentle in disposition, it must be remembered that flesh-eating animals are not the only fighters in the forest. The gorilla is rightly regarded as one of the fiercest animals to be found in the jungle. It is not predatory. It does not slay to eat. It fights only in defense of its young, of its home, or its belongings, for, according to Garner, the gorilla has a keen "property sense." The rhino, which feeds on water weeds, and other coarse herbage, is one of the fiercest of beasts. The lion slinks away when the rhino approaches. Captain Sanderson, the celebrated Indian hunter, tells us that of all the beasts of the jungle none is more terrible to encounter than a wounded bison.

Delusion 6. That flesh foods are more refined and more easily digested and hence more nutritious than are foods of vegetable origin.

So says the apologist for flesh-eating, but the facts are against him. Beaumont showed more than a century ago that beefsteak requires three and a half hours for gastric digestion, whereas boiled rice digests in one

hour. Fat pork requires five and one half hours for digestion, while boiled milk digests in two hours, and baked potato in two and one half hours.

Experiments by Zuntz and others show that the digestion of lean meat requires an expenditure of four times as much energy as the digestion of the same amount of fats or carbohydrates. Sometime ago the writer had the pleasure of entertaining a medical colleague at dinner. After dinner, when taking a short ride, the doctor said; "There was something remarkable about that dinner I just ate. Do you know, Doctor, I feel just as well since dinner as before, which is very unusual for me. For several years I have been unable to do anything at all for two or three hours after dinner and have been compelled to lie down and rest, because of a stupid, confused feeling in my head, and a general feeling of good-for-nothingness. What do you suppose can be the reason?"

"The explanation is easy," we replied.
"You had no meat with your dinner today."

"Was that it?" said the doctor.

"Without doubt. Your experience is a com-

mon one. Some years ago we learned through a friend that Judge X, a member of the Supreme Court of Iowa, remarked after discarding flesh foods that he was able to do as good work in the afternoon as in the forenoon; whereas, for a long time before, his afternoons had been almost wholly lost because of mental inefficiency."

"Well," said the doctor, "if that is the trouble, I will abandon flesh meats forthwith." Three months later he reported that he was in a finer condition mentally and physically than he had been for many years, and had not tasted of a morsel of meat in the meantime.

Mendel has shown that, when eaten in a finely divided state, the protein of beans is not less easily digestible than that of meat. Cajori has shown that the protein of nuts is equally as well utilized as the protein of meats if the nuts are crushed or well chewed. And it has been shown by Tissier, Torrey, and others that the vegetable proteins are so much less prone to putrefaction that it may now be said that it has been experimentally proven that vegetable protein is more economical than animal protein because, while equally

well utilized, less is lost by decomposition in the intestine.

It is not, after all, a question of what food is most easily digestible, but what is best adapted to meet the nutrient needs of the human body. In view of the modern knowledge of food and dietetics there is left no room for question not only that flesh foods are not essential to human nutrition but that they are far inferior to proper vegetable foods and are, indeed, to be classed as inferior and deficient foodstuffs to be used, if at all, only as temporary expedients on occasions of emergency and dire necessity. Vegetable foods furnish an adequate supply of all six of the dietary essentials—protein, fats, carbohydrates, salts, vitamins, and cellulose, and in well balanced proportions. Flesh foods furnish two of these elements, protein and fats, in greatly excessive proportions. But salts and vitamins are very largely deficient, and cellulose and carbohydrates are altogether lacking. Ease of digestibility is by no means the only desirable property of food. A certain amount of indigestible material is essential to serve as roughage and to encourage a degree of colonic

activity sufficient to keep the body free of refuse.

Rats fed by Chalmers Watson on a meat diet ran out in three generations, ceasing to reproduce and showing many evidences of organic degeneration. Stefansson reported that his men became ill on a diet of meat and were only saved by feeding on raw seal's liver. Dogs sicken when fed only on meat. The same is true of lions. They must eat bones as well as flesh. Wolves and foxes rob vineyards and orchards.

The truth is, foodstuffs are not refined and improved by passing through the body of an ox or a hog, but the reverse. All food comes originally from the vegetable kingdom, and it is better to take it first-hand than second-hand.

Delusion 7. That man is naturally omnivorous.

The statement that man is omnivorous is made without an atom of scientific support. It is true the average hotel bill of fare and the menu found upon the table of the average citizen of this country have a decidedly omnivorous appearance. As a matter of fact, man

is not naturally omnivorous but belongs, as long ago pointed out by Cuvier, to the frugivorous class of animals along with the chimpanzee and other anthropoids.

The hog is a truly omnivorous animal. Although he thrives best upon a diet of grass or clover, tender shoots, seeds, and succulent roots, he will eat animal flesh, raw or cooked, with avidity when hungry, and he does not hesitate to regale himself upon carrion after his taste has been cultivated in this direction.

Man is not omnivorous. He cannot subsist upon grass or raw grain. Taking his food from the hand of Nature, without the aid of cookery, he must confine his dietary to fruits, nuts, soft grains, tender shoots, and succulent roots, eggs, and milk. It is true he can acquire an appetite for meat, especially when cooked, but practically all animals can do the same. Hunters sometimes teach their horses to eat broiled venison and cows have been taught to eat fish with avidity. Du Chaillu found in the Island of Magero, the most northern land of Europe, that sheep and goats were fed daily on fish both raw and cooked.

During the siege of Paris in 1870, foods

of all sorts became somewhat scarce and the meat supply in particular became so reduced that not only horses but dogs and other animals frequently appeared in disguise upon the bill of fare. According to A. F. Davidson, Victor Hugo, writing to a friend at this time, remarked: "Our stomach is a Noah's ark into which every beast enters—dog and cat, horse and rat, mouse and elephant—they all meet there."

The great novelist's simile is a capital one. The description applies almost as well to the average American stomach as to that of Victor Hugo in besieged Paris. The list of different animals incarcerated might not be quite so long, but it would certainly be long enough to represent a fine menagerie. Certainly, human stomachs were never intended to be used as Noah's arks, menageries, potter's fields, or sepulchers.

Delusion 8. That flesh foods are stimulating and thus supply an element needed especially by brain workers.

That flesh foods are stimulating cannot be denied. But this is not a useful quality. Stimulation is not strength. A stimulant is a

substance which excites the body to effort but does not supply energy to support the effort. The normal stimulant of the body is the brain and central nervous system. The nerve centers are storage batteries which store up energy and transform it into nerve force by which the entire machinery of the body is kept in action. In a healthy body, properly nourished, the nerve centers of the brain and the spinal cord give the various organs just the amount of stimulation they need to perform the various kinds of work required of them, mental, muscular, and vital.

The function of food is to supply the energy needed to support the work done and to keep the machine in repair. A chemical stimulant, whether in the form of food or a drug, can do only harm. It cannot supply energy. It is simply an irritant that may cause an undue, useless, and hence wasteful expenditure of energy. This is just what flesh foods do. Experiments by Rubner showed that 40 per cent of the energy of the meat eaten is wasted in surplus heat which is produced and thrown off through the skin without being employed in useful work. Thus

40 per cent of the energy used in digesting the meat was wasted and also a like per cent of the energy used in elimination of the urea and other waste products derived from the meat.

As regards mental efficiency, there is no evidence that meat renders even the smallest special service. The facts, indeed, array themselves upon the other side of the argument. The chimpanzee, a primate, and a non-flesh eater, is certainly far more intelligent than the dog, a carnivore. It is not disputed that the higher apes stand next to man in the scale of animal organization.

The dog, after a meal of meat, usually lies down and spends hours in a state of lethargy. On this account, doubtless, dogs are usually fed once a day, at night. Hunters and breeders of hunting dogs do not feed their dogs meat. If meat is ever allowed at all, it is only in small amount and after having been well cooked. Raw meat is recognized as injurious even to dogs. Many business men have learned by experience that a hearty meal of meat produces mental dullness and after-dinner drowsiness. A famous boxer who lost in

a contest he was confident of winning, charged his failure to his last meal of meat. “ ‘Twas the beefsteak that done it,” was Battling Nelson’s explanation, according to the headlines in the morning’s papers, and the boxer added, “The beefsteak made me tired.” The boa constrictor swallows a rabbit and goes into a comatose state for a week.

Delusion 9. That beef tea is a useful nutrient.

Beef tea was formerly supposed to be a highly valuable food and almost essential for feeble patients. It is now known that the opposite is true. Beef tea is, according to an eminent French physician, “a veritable solution of poisons.” The late Dr. Austin Flint, of Bellevue Hospital College, one of the most eminent physicians America has ever produced, had a chemical analysis made of beef tea, and found the result to be practically the same as that yielded by the analysis of urine. It was inevitable that this should be the case, because beef tea, animal broths of all sorts, bouillon, and meat extracts, are all extracts of the tissues, artificially prepared, and the

urine is also an extract of the tissues, produced by the vital processes active within the animal body. Beef tea is now known to be a poison and an intoxicant and in no proper sense either a food or a stimulant. It has no sustaining power, and hence its use is not indicated for fever patients or as a means of building up feeble or convalescent patients. Dr. Flint asserted that thousands of fever patients have been starved to death on beef tea. Instead of nourishing the body, meat extracts burden it with poisons which the liver must destroy and the kidneys eliminate.

Many years ago Claude Bernard, the eminent French physiologist, made an experiment in which he demonstrated that meat extract is a poison. He fed a dog on meat extract and water only, and gave to another dog simply water. The dog that received only water lived several days longer than the other dog.

Delusion 10. That a meat diet is required to prevent or cure gastric acidity.

This belief is based upon a false idea of the cause of gastric acidity. This was formerly supposed to be the result of acid fermentation

in the stomach by yeast or other acid-forming organisms. It is now known that acidity of the stomach contents due to fermentation is an exceedingly rare condition, being almost never found except in cases of obstruction at the outlet of the stomach. The real cause of acidity is an excessive production of gastric acid. It is true that the use of meat gives temporary relief in this condition owing to the fact that the acid present in excess combines with the meat and is thereby neutralized, the chemical effect of meat being like that of soda. But meat differs from soda in the fact that while soda neutralizes the acid, meat not only neutralizes the acid but at the same time excites the gastric glands to excrete more acid, thus aggravating instead of curing the diseased condition. Meat is one of the most powerful stimulants of the acid-forming glands of the stomach known. This was demonstrated by Pavlov in experiments upon dogs, and his observations have been amply verified in the case of human beings. The publication of Pavlov's discovery, something more than 20 years ago, led to a complete revolution in the practice of gastric specialists

as regards the recommendation of meat in cases of acidity. At the present time, no well-informed stomach specialist would think of recommending meat in these cases. Meat not only produces and aggravates gastric acidity through its direct stimulating effect upon the stomach, but also encourages intestinal putrefaction and constipation, which cause gastric acidity (Taylor).

The successful treatment of gastric acidity requires the suppression of meats, at least of lean meats, as one of the conditions necessary for a cure.

Delusion 11. That a meat diet is desirable in tuberculosis.

It was formerly supposed that meats of all sorts were especially valuable in the treatment of tuberculosis. Many years ago a German enthusiast opened an institution for the purpose of feeding consumptives exclusively on a meat diet, using chiefly raw meat. It is scarcely necessary to add that the enterprise failed completely within six months.

Meats increase the work of the kidneys in two ways: first, by introducing poisonous sub-

stances into the body; second, by encouraging the production of body poisons through the putrefaction of the undigested food residues in the colon. A patient suffering from tuberculosis or consumption rarely dies of this disease. Even in the most advanced stages there is still left sufficient lung capacity to carry on the function of respiration. The consumptive does not die from lack of lung capacity but from chronic poisoning. Post-mortem examinations made in hundreds of cases at the Phipps Institute of Philadelphia, showed that eighty-six per cent of all persons suffering from tuberculosis of the lungs have advanced disease of the kidneys. Failure of the kidneys is, in fact, among the most common causes of death in lung tuberculosis.

Now, it is the almost universal custom of physicians to advise the patient suffering from Bright's disease to avoid butcher's meat. Hence, it must be clear that the consumptive who wishes to attain the greatest possible success in combating this disease should discard meats as one of the most effective measures for protecting his kidneys, which always have an excess of work in tuberculosis because of

the great quantity of poisons thrown into the circulation by the tubercle germ.

Meat is no longer prescribed for tuberculous patients in as great quantities as formerly. The late Dr. Sternberg a few years before his death, stated in a letter to the writer that he had satisfied himself by clinical observation that patients suffering from tuberculosis did not require large quantities of meat, as had previously been maintained, but the very reverse. Dr. Grenfell in his wonderful book, *Labrador, the Country and the People*, tells us that one out of three or four deaths among the Eskimos is due to tuberculosis. This fact shows at once the folly of trusting to a flesh diet for protection against this disease and the uselessness of a high protein ration in its treatment.

The idea that flesh-eating is necessary for the cure of tuberculosis or the prevention of this disease is clearly shown to be incorrect by the statistics of mortality in relation to occupation gathered by the United States government. The reports of the census show that *the mortality rate of butchers from consumption is 261 as compared with 220 for all men.*

Delusion 12. That a meat diet is necessary in diabetes.

For more than a century, and until very recent times, it was maintained by many physicians that a diet consisting almost exclusively of flesh foods was specifically indicated in diabetes. Up to within a comparatively short time it has been the custom, indeed, to feed diabetics almost exclusively on a meat diet. It is now known, however, that a meat diet does not cure diabetes but actually aggravates the disease, increasing the loss of sugar in the urine (Von Noorden), increasing acidosis and hence the danger of diabetic coma, and in various ways aggravating the disease instead of combating it.

Many hundreds of patients have been successfully treated for diabetes at the Battle Creek Sanitarium on a non-flesh dietary. This regimen has been proven to be superior to a flesh diet in dealing with this disease.

Delusion 13. That a flesh diet is essential in the treatment of obesity.

A lean-meat diet was long considered to be necessary in the treatment of obesity, as well as that of diabetes. It is now well

known that in cases of obesity there is a decided tendency toward the development of acidosis, which is encouraged by meat feeding. The proper diet in obesity is a bulky diet rich in cellulose, consisting largely of fruits, fresh vegetables, and greens, which combat the bad effects of restricted nutrition by supplying an extra amount of lime, salts, and food iron.

In the dietetic treatment of obesity, a strictly non-flesh dietary has been employed for more than fifty years at the Battle Creek Sanitarium, and has been shown to be superior by the successful treatment of many thousands of cases.

Delusion 14. That meat is required in beri-beri and pellagra.

The idea advanced some years ago that meat is necessary for the cure of beri-beri, or that it is the best remedy for this disease, has been well shown to be erroneous. It is now known that a meat diet is a deficiency diet. Ordinary meat is greatly lacking in vitamins. The fat-soluble vitamin is almost wholly absent in meat, and the water-soluble vitamin *B*,

which is especially concerned in beri-beri, is present only in moderate amount.

In the animal body the vitamins are concentrated in the liver, kidneys, and other glands, chiefly those which are concerned in the formation of hormones; and hence, instead of a meat diet being a cure for beri-beri, it may be the cause of grave nutritive failure unless, in addition to ordinary meat, liver and kidneys are freely fed. Indeed, if one is to subsist largely upon flesh food, he can only avoid ultimate disaster by taking care to eat the whole animal—liver, kidneys and other viscera as well as the bones—to avoid suffering the consequences of a deficiency of vitamins and lime. What has been said of beri-beri is equally true with reference to scurvy. An exclusive diet of cooked meats soon produces symptoms of scurvy.

In the Russo-Japanese war, it was found that beans were superior to meat as a means of preventing beri-beri, and the Japanese sailors greatly preferred the beans.

Drs. Goldberg and Tanner have recently shown that persons suffering from pellagra may be cured by a moderate increase of the

intake of milk. It seems to be established that a deficient supply of "complete" protein is the cause of pellagra and this needed element may be best supplied by the free use of milk.

Delusion 15. That meat is essential as a "building-up" or restorative food.

Meat is, in fact, a very defective food. A widespread cause of nutritive failure is a lack of lime in the food, and flesh foods of all kinds are greatly deficient in lime. The lime of an animal's body is found in the bones, not in the soft parts. Only one two-hundredth part of the lime is found elsewhere than in the bones. The lime of vegetables is closely associated with the protein, so that when one gets protein from vegetable sources he will always get a sufficient amount of lime, since the lime goes with the protein. But if meat is the only source of lime there will soon be a great deficit, because in animals the lime is in the bones and lean meat contains scarcely a grain of lime to the pound. As 30 grains of lime are needed to satisfy the daily needs of the body, a person getting his lime from

this source would have to eat not less than 30 pounds of meat per diem, a feat which could not be accomplished even by an Eskimo.

Delusion 16. That meat is needed by growing children.

This idea has been based, not on scientific grounds or on clinical observation, but purely on the fancy that red meat is the best possible source for the muscular tissue which the growing child needs to form about one-half the weight of his body. Modern physiologists tell us that meat is not at all necessary for muscle building, and that it is an inferior source for the protein needed for body building. The protein of milk, of the soy bean, and of nuts is known to be superior to meat as a source of body nitrogen. But it has also been shown that carbohydrates, starch and sugar, are equally as necessary as protein for the tissue building of a growing child; and analyses of mother's milk made by Rübner and others have proved that the nursing child requires daily only one calorie per pound of its body weight of protein, which would be the equivalent of about five ounces of dry protein a month for a child weighing 20

pounds. This is true notwithstanding the fact that 40 per cent of all the protein needed by an infant is required for tissue building. The requirement of protein is so small that it is easily derivable from the various foodstuffs provided by a varied diet, particularly if not less than a pint of milk is taken each day. Milk is an article of food especially adapted to the needs of the growing animal, and a young child should have a quart daily.

Delusion 17. That meats are needed as a stimulus to appetite.

Though it is certain that meat flavors are not needful for digestion, it is, of course, desirable that foods should be palatable. It is possible to secure from the vegetable kingdom the appetizing flavors provided by meat. Vegetable extracts are now prepared (yeast extracts and soy sauce) which are finer in flavor than the best meat extracts, but which are wholly free from the uric acid and other deleterious substances found in meat extracts. It has been shown that the strong flavors and the excess of protein accompanying a meat diet are very prolific sources of gastric disorders of various sorts, particularly

hyperacidity, gastric catarrh, and gastric and duodenal ulcer. An eminent stomach specialist some years ago stated in a discussion of gastric ulcer by the surgical section of the American Medical Association that "ulcer of the stomach is a meat-eater's disorder." There are also many who believe that the great increase of cancer of the stomach in recent times is due to the consumption of meat. The fact that cancer of the stomach occurs more frequently in men than in women would seem to corroborate this idea, since it is well known that as a rule men are much larger consumers of meat than are women.

Delusion 18. That the beef industry is necessary as a part of a national economic system.

That this is untrue was abundantly shown by the experience of the war. Every country cut down its meat ration, and all European countries greatly reduced their live stock. In Denmark, where the meat supply was almost wholly cut off, the death rate was reduced 35 per cent, or from 12.5 per thousand to 10.4, the lowest death rate ever recorded for any country (Hindhede).

The scarcity and high price of food brought about by the World War compelled a more intensive study of the economics of nutrition than has ever been made before. Scientific men of all countries were appealed to by their respective governments for the last word on the science of feeding, especially with reference to means for reducing the cost without lessening efficiency.

The German people were informed by their most eminent scientists that meat was non-essential and could be safely omitted from the bill of fare. The great Inter-Allied Scientific Food Commission pronounced meat non-essential and could be safely omitted from essential foodstuffs. The report of this, the most authoritative body which has ever spoken upon the food question, may be justly regarded as the last word upon this subject. (See p. 341)

Says Dr. Cattell, Editor of the *Scientific Monthly*:

Dr. Armsby, probably the leading American expert on animal nutrition, has estimated that of the energy of grain used in feeding the animal there is recovered for human consumption about eighteen per cent in milk, and about three and one-half per cent in beef. In an official report on the food supply of the United Kingdom, it is estimated that the production of 100 calories of human food in the form of milk

from a good cow requires the consumption of animal feed by the cow of 2.9 pounds starch equivalent; 100 calories milk from a poor cow is estimated to require the consumption of 4.7 pounds; while 100 calories of beef from a steer two and one-half years old is estimated to require the consumption of nine pounds of starch equivalent in food [1,800 calories].

Stated in terms comparable with those used by Dr. Armsby, this would mean that the good milk cow returns twenty per cent of the energy value of what she consumes, the poor milk cow twelve per cent, and the good beef steer only six per cent. Although this estimate is more favorable to the beef steer than is that of Dr. Armsby, yet even by this estimate it will be seen that the poor cow is twice as efficient, and the good milk cow more than three times as efficient as the beef steer in the conservation of energy in the food supply.

Considering the whole length of life of the animal, Professor Wood, the leading English agricultural expert, estimates that the cow returns in milk, veal and beef, one-twelfth as much as she has consumed, while the beef steer returns only one-sixtyfourth. In other words, the cow is five times as efficient as the beef steer as a food producer when the whole life cycle of the animal is considered.

Similarly it has been estimated by Cooper and Spillman (*Farmers' Bulletin*, No. 877, 1917, U. S. Department of Agriculture) that the crops grown on a given area may be expected to yield from four to five times as much protein and energy for human consumption when fed to dairy cows as when fed to beef steers.

But not only is the milk cow several times more efficient than the beef steer in the conservation of proteins, fats and carbohydrates for human consumption, but in the gathering and preparation of mineral elements and vitamins she contrasts even more favorably with the beef animal. It is largely because of its richness in calcium and in fat-soluble vitamin that *milk is the most efficient nutritional supplement to bread or other grain products.*

This is precisely the argument the writer has been offering against flesh-eating for more than forty years. *To feed an animal a hundred pounds of food to get three pounds in return is certainly uneconomical.* In the case of stall-fed oxen three years old the waste is still greater, a hundred to one.

During the war, in discussing in *Science* the question of the food supply, Dr. Graham Lusk, of New York, said: "It is wrong to feed bread grain to pigs when human beings need it more." Of course it is wrong. When it takes ten pounds of good grain to make one pound of pork, the food value of which is less than that of an equal weight of corn, it is evident that feeding corn to pigs is a wasteful and non-economical procedure. From the standpoint of food conservation, the farmer might just as well set fire to his corn field and burn up nine-tenths of it as to feed his corn to pigs. The facts upon which Professor Lusk bases his statement have long been known to students of scientific feeding. The observations at agricultural experiment stations in this country and Europe long ago demonstrated the enormous waste that occurs in the feeding of cereals to domestic animals.

Perhaps the reader will say, "But we have more corn than we need for ourselves." Yes, but somebody needs the corn. Every pound of corn fed to a hog deprives somebody of needed nourishment. The high cost of living, which is largely responsible for the present social unrest and threatened revolution in various countries, is in considerable part due to the destruction of food staples in the feeding of domestic animals. The amount of food produced every year in this country is quite sufficient to feed a population three times as great, if the larger part of it were not destroyed in the wasteful live stock industry. The statistics sent out by the United States Department of Agriculture indicate that only about ten per cent of our great corn crop is utilized for food by the people of this country. Nearly all the rest of it is fed to domestic animals and in large part wasted. At some future day, when the world has learned to live biologically, it will be looked upon as an act of supreme folly to allow pigs and cattle to consume food staples while human beings go hungry because of the scarcity of bread. Why not begin to reform now?

The Law of Diminishing Returns Versus Flesh-Eating

Professor T. N. Carver, of Harvard University in the *Popular Science Monthly*, states facts which clearly demonstrate that the law of diminishing returns will necessarily compel the diminished consumption of beef and increased dependence upon corn, potatoes, bananas, and similar foods which "respond to intensive culture." According to Professor Carver, it takes treble or quadruple the cost of cultivation to double the products of a given area of land. This is why England finds it cheaper to import a large part of her food supply, especially her beef and wheat, "than to cultivate her own farms with a sufficiently high degree of intensity to enable her to live upon her own soil."

It is inevitable that in time the entire tillable soil of the earth's surface will be occupied through the increase of population, and it will be necessary to make every acre of land go as far as possible in supplying nutriment for the teeming population. This will require, as Professor Carver suggests, a change in the standard of living, and he adds

very aptly; "Possibly it might be a good thing to make this change in our habits." The most superficial study of the economics of diet is sufficient to demonstrate the folly of subsisting upon second-hand food, which while greatly inferior in quality costs anywhere from ten to fifty times as much as the products of the earth in their natural state.

The calculations of expert statisticians, as demonstrated by a recent paper by Pearl and Reed, of Johns Hopkins University, indicate that preparation must be made in this country for the support of a population at least twice the present number of inhabitants, or sixty-six persons for each square mile of land area. This would require a food supply equivalent to about 250,000,000,000,000 calories per annum.

These experts remark that, unless we are able to reduce our daily rations to less than 3,000 calories a day or to increase radically our food production, it will be necessary sooner or later to import half the food required by the future republic; and, if the population should continue to increase after having doubled, the necessity for a greater

food supply would become still more pressing.

In view of these facts, it is clear that a proper economic policy in relation to our food supply does not demand the slaughter of domestic animals, but rather the elimination of this wasteful industry.

Delusion 19. That a meat diet is necessary to insure reproductive activity.

This consideration has been brought forward as an argument in favor of meat-eating. Curiously, those who offer this argument in behalf of a meat diet seem to have overlooked the fact that reproductive activity is, in general, far greater among non-flesh eating animals than among carnivores, as witness the great herds of antelopes which formerly covered this continent and are still found in the great unoccupied spaces of Central Africa. A moment's consideration will show that unless vegetable feeders were much more prolific than flesh-eating animals, the latter would soon greatly outnumber and exterminate the non-flesh-eating, for flesh-eating animals prey upon vegetable feeders. One pair of lions will consume not less than one sheep a day.

Consequently, not less than 365 sheep will be required to sustain two lions for one year; and if the average age of the lions is reckoned at ten years, the number of sheep required to support one pair of lions during their lifetime would be not less than 3,650. And if we take into account the sheep required to feed the progeny of a single pair of lions, we will have to increase these figures to ten or twelve thousand, as the number required to support one pair of lions and their offspring during ten years. The extreme prolificity of rabbits and rats, which are also naturally vegetable feeders, is well known. The teeming human populations of rice-eating India, Japan and China also bear testimony to the adequacy of a non-flesh diet for insuring reproduction.

Delusion 20. That meat is a harmless luxury.

Many who are ready to admit that meat is by no means a necessary part of the human dietary, are still ready to maintain that it is a harmless luxury and may be used with considerable freedom without risk of injury. The palate-tickling flavors of meat are by

many regarded as the most attractive of gastronomic pleasures. The idea that the moderate use of meat or occasional indulgence in meat dishes is harmless is offered as an excuse for not rigorously excluding meat from the dietary by many who are fully aware that meat is an article which can not be recognized as either necessary or harmless when made a food staple.

Here are some facts to which such persons should give consideration:

1. While all meats are more or less harmful, the chances are very great that the particular specimen of meat eaten, even as an occasional indulgence, may be infectious to an unusual degree. The writer has known of not a few instances in which persons who seldom eat meat have suffered severely, even fatally, from ptomain poisoning or some allied affection after having eaten oysters, fried chicken, Thanksgiving turkey, or some other meat dish as a casual digression.

2. It should be remembered that persons who are not accustomed to eat meat are more likely to suffer from acute ill effects from meat-eating than those who are regular eaters.

of meat, for the reason that a stomach which is required to deal with meat daily produces a gastric juice resembling that of carnivorous animals, which is better adapted to the digestion of meat than is the gastric juice produced by the stomach of the flesh abstainers, being more acid, and far more highly endowed with the disinfecting properties needed to safeguard the eater of meat.

3. Since the importance of changing the intestinal flora has come to be recognized, it must be evident to any one who will give the matter a moment's consideration that when a person who desires to maintain a good intestinal flora, that is, a non-putrefactive condition of the food residues in the colon, and to this end employs means for changing the intestinal flora, the taking of meat, even occasionally, could have no other effect than to reinfect the intestine by introducing into it countless millions, even billions, of the pernicious organisms which it is desired to suppress. It is impossible to maintain a good flora without exercising the greatest care to avoid introducing into the alimentary canal foods of any sort which harbor putrefactive

organisms. In this all bacteriological authorities are agreed, hence the eating of flesh even occasionally must be regarded as unhygienic and irrational. Meats of all sorts, including flesh and fowl, should be excluded from the dietary as rigorously as impure water, unclean milk, stale eggs, limburger cheese and other foods which harbor putrefactive germs.

SCIENTIFIC OBJECTIONS TO THE USE OF MEAT

The use of flesh foods is unbiologic; that is, as shown in the preceding pages, flesh foods are not adapted to the biologic or nutritive needs of the body. All food is originally produced by the vegetable kingdom, which has for its function the storing of energy which it gathers from the sun's rays. An animal, like a locomotive, is a mechanism for using energy. Any energy material found in flesh is simply energy which has been gathered for use by the animal itself but has not yet been used. When one animal eats the flesh of another, it is merely taking vegetable food at second-hand, for vegetable food is the original source of all animal energy.

Flesh consists of practically two food principles, protein and fat. Lean meat is almost pure protein. The human constitution, like that of other primates, is adapted to a low protein diet. Man requires a large proportion of carbohydrates, which should constitute the bulk of his dietary.

According to Professor Chittenden, an international authority, the relative proportions of the three great food principles required for human nutrition are 10 per cent protein, 30 per cent fat, and 60 per cent carbohydrate. Since a diet consisting of bread and ordinary vegetable foods, with a reasonable allowance of milk and eggs, contains more than 10 per cent of protein it is evident that meat cannot be added even in very small amounts without creating an excess of protein. The evil effects of this excess are manifested in autointoxication, from putrefaction of the remnants of meat which escape digestion. The result is overwork of the kidneys, not only in eliminating the poisons produced by putrefaction but in dealing with an excessive amount of urea.

Folin has demonstrated that the amount of protein which can be actually utilized by the body in the repair of living tissues is very small—scarcely more than five per cent of the total food intake. Any excess of protein beyond this never enters into the vital work of the body at all, but is eliminated as so much waste matter in the form of urea.

The average American eats daily two-thirds of a pound of meat in some form, chiefly lean meat, the greater portion of which renders practically no service to the body whatever, but which, after being digested, is worked over by the liver into urea and eliminated by the kidneys. There is thus imposed upon the body not only the surplus work of digesting unusable material, but an unnecessary tax on the liver and kidneys, which contributes to their premature failure and the development of disease in these important organs.

The Human Liver Not Adapted to a Meat Diet

The recent discovery that the human liver is incapable of converting uric acid into urea is acknowledged by able physiologists to be an unanswerable argument against the use of flesh foods as a part of the dietary of man. Uric acid is a highly active tissue poison. It is not only a cause of gout but also of Bright's disease, of hardening of the arteries, high blood-pressure, premature failure of the heart, and many nervous disorders. The

livers of dogs, lions, and other carnivorous animals detoxicate uric acid by converting it into urea, a substance which is much less toxic and which is much more easily eliminated by the kidneys.

Flesh foods of all sorts contain considerable quantities of uric acid. For example, beefsteak contains 14 grains of uric acid to the pound; sweetbread, 70 grains to the pound. The significance of these quantities is very great in view of the fact that the amount of uric acid normally produced daily in the body and eliminated by the kidneys is only about 6 grains, the amount contained in a little more than one ounce of sweetbread. Hence, the eating of half a pound of sweetbread, a very common occurrence, will introduce into the body about six times as much uric acid as the kidneys are normally required to eliminate; and the eating of half a pound of steak would more than double the work normally required of the kidneys.

The intake of uric acid with the food is not a matter of any particular consequence in the case of the dog or the lion, because the livers of these animals, as already noted, are

able to destroy uric acid by converting it into urea, thus preventing the harmful effects which it might otherwise produce. But man, not being naturally a meat-eating animal, is not provided with the means for protection against uric acid which the dog and the wolf possess. His liver cannot destroy uric acid, and so he suffers from meat-eating injuries to which animals naturally carnivorous are not exposed.

The Important Differences Between Meat and Milk

A popular but very unreliable and more or less sensational writer on foods and other topics says, in a work entitled *The Conquest of Consumption*, "Children are born meat-eaters," and intimates that milk is only liquid flesh. This is most erroneous and misleading. Milk is not liquid flesh. It is much more. Milk contains sugar, lime, and vitamins—dietary essentials—all of which are lacking in meat. According to Gautier, the solids of mother's milk, which is the natural diet of the child, consist of about 20 per cent protein, 30 per cent fat, and 50 per cent sugar; whereas,

the solids of average meat consists of 80 per cent protein, or four times as much as milk, 20 per cent fat, and no sugar at all. Certainly there is a very wide contrast between meat and milk, and it is a gross perversion of the facts to represent milk as liquid meat. As a matter of fact, milk much more closely resembles liquid bread and butter than liquid meat.

Milk is a natural foodstuff through which the new-born of each species of mammal are provided with liquid nourishment exactly adapted to the particular needs of the species; but flesh either in solid or liquid form is in no proper sense a substitute for milk, and it is not even allied to it in its chemical composition.

It is most unfortunate that the general public has been left to the newspaper as the chief source of information on matters pertaining to diet and hygiene. A vast amount of erroneous teaching has been sent broadcast, the results of which cannot be otherwise than disastrous to those who are thus misled.

Meat Deficient in Vitamins and Food Lime

One of the most serious objections to the use of flesh food is its incompleteness. In this respect the flesh of all animals is alike. All flesh foods, as commonly eaten by man, are highly unbalanced, containing a very great excess of protein while almost totally deficient in lime and growth-promoting vitamins. The reason for this is simple. Both lime and vitamins are derived originally from the vegetable kingdom. Lime is gathered from the soil and changed by the vegetable into organic or food lime, and vitamins are manufactured by the vegetable through the subtle alchemy of the green leaf, stimulated by the magic influence of the sun's rays. When an animal eats foodstuffs containing lime and vitamins these subtle elements are not stored up in the parts of the body which are commonly eaten, but are concentrated in other parts of the animal's body, the lime being almost wholly deposited in the bones and the vitamins stored in the liver, kidneys, and other glandular structures.

It is evident, then, that in order to secure in the form of animal flesh the food prin-

ples which the slaughtered animal has gathered from the vegetable kingdom and stored in its body, it is necessary to eat the whole animal—bones, liver, and kidneys as well as the fat and muscles, the parts usually eaten.

When the lions of the London Zoo were fed on lean meat exclusively their cubs were born with club feet and became bow-legged and otherwise deformed as they developed, because of the absence of lime. The difficulty disappeared when the keepers, under the advice of Treves, an eminent surgeon, added to the lions' bill of fare bones and bone meal.

Eskimos Eagerly Seek Vegetable Food

It is interesting to notice the care the meat-eating Eskimos take to supply themselves with vitamins. It is evidently for this reason that they eat the stomachs of deer and the entrails of the ptarmigan (a vegetable-feeding bird) with their contents. According to Stefansson, the practice of eating raw and frozen liver is also universal among the Eskimos, undoubtedly for the same reason. Grass and other vegetable foods found in the stomachs of the reindeer and the entrails of the ptarmigan

contain rich stores of vitamins, which are not found in oils and fat to any considerable extent and are wholly absent from lean meat.

It is thus evident that some of the most disgusting features of the diet of Eskimos are the result of their instinctive craving for vitamins. But the practices of the Eskimos are the result of necessity and not choice. According to Mr. Turner, the Eskimos who live in the vicinity of trading stations eagerly adopt the use of flour, bread, peas, beans, and rice, and "are very fond of them, and often express regret that they will be deprived of them when on their hunting expeditions."

In the short summer season, many berries and a few other edible things grow to maturity, which are eagerly seized upon by the natives as soon as they make their appearance. Mr. Turner tells us that "during the season when various berries are ripe, all the people gorge themselves. They have a special fondness for the *akpik* (*Rubus Chamaemorus*). The sun scarcely reddens the side of these berries, locally known as 'bake apple,' before the children scour the tracts where they grow, and eat of the half-ripened fruit with as much

relish as the civilized boy does the fruit purloined from a neighbor's orchard. Other berries contribute their share as food. The *akpik* is better known in this country as the cloudberry."

Nansen, in his interesting work, *Eskimo Life*, confirms the observations of Mr. Turner, and tells us that the contents of the reindeer's stomach are regarded as one of their delicacies. According to Nansen, "the last thing an Eskimo lady enjoins upon her lover, when he sets off reindeer-hunting, is that he must reserve for her the stomach of his prey. It is no doubt because they stand in need of vegetable food that they prize this so highly, and also because it is in reality a very choice collection of the finest moss and grasses which that gourmet, the reindeer, picks out for himself."

When the above was written by Nansen, neither he nor any one else was aware of the fact that the vegetable contents of the reindeer's stomach contained the precious vitamins which are, for the most part, lacking in the Eskimo diet.

Lastly, it is to be noted that the Eskimo is

not flourishing on his defective bill of fare. This dwarfed and diminishing race are the puny survivors of the hardy and vigorous race which fought its way through the long dreary days of the Glacial Periods in Europe. They manage to exist, notwithstanding their unnatural bill of fare, but they have not prospered and are evidently doomed to early extinction.

III Effects of Meat Diet on Arctic Explorers

Explorers like Hall, Peary, and Stefansson have shown the possibility of living upon Eskimo fare for several years, but the effects have not been good. Hall died of apoplexy when he should have been in his prime. Peary died prematurely of cardiovascular renal disease, and Stefansson was very ill on his last journey. In relation to Hall, who was the first advocate of the Eskimo diet for the Arctic regions, Rear-Admiral Davis tells us: "For several weeks just previous to sailing he was under medical treatment. We learn from a letter written by Mr. Joseph Cox, presiding judge of the Court of Common Pleas, Cincinnati, in which city Captain Hall enjoyed

a short visit to his family before he sailed, that while in company with the judge, going up Vine street, near Sixth, he complained of suffering from vertigo; said that it troubled him frequently, and added that the only thing that gave him relief was eating one or two pounds of raw beefsteak; and bade me (the judge) goodbye, saying that he must go to a butcher's shop and get some now to relieve him, so that he might recruit and be ready to return to New York." The recent death of Shackleton, another arctic explorer, must be regarded as another instance of sacrifice to a high protein diet. It may be recalled, also, that Atwater, an advocate of the high protein diet, also died of apoplexy.

Meat Saturated with Tissue Poisons

A notable difference between the flesh of animals and vegetable foodstuffs consists in the fact that all flesh foods contain a considerable proportion of waste and poisonous matters which are the result of tissue work and which at the death of the animal are on their way to the liver, kidneys, colon, and other excretory organs for elimination.

As Bouchard showed long ago, "the body is a factory of poisons." This is true of every living creature. Just as the innocuous fuel which goes into a stove or a furnace is converted into poisons and death-dealing ashes and gases, so the food eaten is likewise converted into poisons by the changes which it undergoes in the body. These changes are a form of combustion.

Food is, in fact, properly regarded as fuel, and the poisonous residues resulting from the various vital activities of the blood which the food supports are washed out of the tissues by the blood and other fluids and carried to the excretory organs for rejection.

All normal flesh is saturated with these poisonous matters, so-called extractives, which constitute, according to Gautier, about 10 per cent of the total solids of flesh.

In eating meat, one necessarily adds to the toxins produced by his own body those produced by the tissues of another animal, and thus imposes upon his kidneys a task which should have been performed by the kidneys of the slaughtered beast.

Meat Readily Putrefies — Natural Food-stuffs Do Not

Another objection to meat as an article of food grows out of the fact that of all food-stuffs it most readily undergoes putrefactive changes and as eaten is always more or less advanced in the process of decomposition. Eggs undergo putrefaction as does meat, but this is not true of either milk or vegetable foodstuffs, which may undergo decay and fermentation but not putrefaction. Fermentation differs from putrefaction in that it produces acids which are practically harmless, while putrefaction produces toxins, ptomaines, the most virulent poisons, some of which even rival the venom of snakes in their potency.

In 1912 the writer received from Professor Tissier, of the Pasteur Institute, a letter in which he made the interesting statement that after an extended research the fact had been established that animal protein is twice as putrescible as vegetable protein. The protein of cereals and legumes, that is, grains, seeds, and pod-bearing plants like peas, beans and lentils, is least putrefactive of all proteins.

Research has also shown that, even after having been acted upon by the digestive juices, proteins of vegetable origin are much less putrescible than those of animal origin. In view of this important fact, Professor Tissier himself has wholly renounced the use of flesh foods of all sorts, and for many of his patients he advises the disuse of all animal proteins, including eggs and milk as well as meat.

The Poisons of Meat

According to König, lean meat is 75 per cent water, 16 to 24 per cent protein, 0.5 to 3 per cent fat, 0.8 to 1.9 per cent ash, 0.5 per cent extractives.

The extract of meat contains a large variety of tissue poisons, among which are xanthins (uric acid), adenin, tyrosin, and leucin, besides 10 or 12 per cent of creatin and creatinin, together with ignotine, novaine, carnitine, vitiatine, oblitine, carnic acid, and numerous other waste products which have been recently isolated by Kutscher.

Roger, the eminent pupil and successor of the famous Bouchard, says of meat extracts; "The toxicity of extracted matters is real.

Extracts of meat contain 22 to 25 per cent of salts of potash and 10 to 15 per cent extractive matters. Their ingestion, even in moderate doses, produces intestinal disturbances, notably diarrhea. Dogs fed with extracts of meat die more rapidly than dogs which receive nothing at all. A person in health may use extracts of meat in small quantities, but *it is necessary to prohibit meat extracts for invalids.*"

Of course all poisons may be taken in small quantities by healthy persons without producing violently poisonous effects, but certainly it cannot be denied that some injury is done. Indeed, that this is true has been proven by experiments upon animals.

The tissues of all animals contain poisonous materials, the products of the vital activities which are constantly taking place in all living beings. The activities of every tissue result in the formation of special toxins, fatigue poisons, and toxic residues which are more or less perfectly removed from the tissues by the blood during life and carried to the kidneys and other excretory organs to be discharged from the body. The formation

of these poisons is in life so rapid that it is only necessary that their elimination should be suspended for a short time for fatal results to develop. In the death of an animal, as soon as the heart ceases to beat the removal of these toxins from the tissues ceases, but the development of toxic matters continues for some time after, until the final moment of actual tissue death when *rigor mortis* occurs. It is consequently evident that the amount of these toxins found present in the tissues of a dead animal is much greater than that which is found during life. The character of these poisons is to a considerable degree well known. Many of them have long been familiar through the examination of the urine, which is simply an extract of the tissues.

While it is no doubt true that the chief objection to the use of meats of various sorts as a human foodstuff is the enormous quantity of toxins produced by the growth of putrefactive bacteria in the intestine, it should not be forgotten that meats of all sorts contain a considerable amount of toxins which are the result of protein putrefaction. This is always true, since meat as eaten is in a state of begin-

ning decomposition and consists in part of the poisonous waste substances which are always found in animal tissues and which accumulate rapidly after death.

Meat Extracts

According to Gautier, the world's greatest authority, these waste substances are found in ordinary meat broth in the proportion of about one per cent or about one-half of the total solid constituents. These extractives when taken into the stomach, produce effects "comparable to those of the caffeine and thein of tea and coffee." Says Gautier, with further reference to these extractives: "We must not forget that these bases are poisonous." The observations of Gaucher, cited by Gautier, have clearly proved this. A guinea pig weighing one pound died after receiving several subcutaneous injections of sarcin, a constituent of meat extract. The animal grew thin and passed a deep yellow albuminous urine and died at the end of fifty days. Another guinea pig died as the result of subcutaneous injection of one and one-half grains of creatin, always found in beef tea. The urine was at first a deep brown and slightly

albuminous. Later, complete suppression of urine supervened and death rapidly followed. Postmortem examination showed death to be due to nephritis.

According to the analyses of Gautier, *a quart of beef tea contains enough creatin to kill nine guinea pigs*, besides certain salts, purin bodies, and other substances even more toxic than creatin. When to this we add the fact that the nutritive value of meat broths is practically nothing (according to Gautier only one calorie to the ounce) we find ample justification for the assertion of Legendre that bouillon is "a veritable solution of poisons," and the caution of Roger that meat broths and extracts should be wholly avoided by invalids; and if *dangerous* for invalids they certainly can not be *wholesome* for anyone.

The meat extracts in general use are, if possible, still more objectionable than freshly prepared broths. Fully 20 per cent of these extracts consist of poisonous substances. So long ago as 1871, P. Muller observed that the addition of an ounce of meat extract to his daily diet produced diarrhea, an evident defensive effort. Two-thirds of an ounce of

a good extract of beef added to the regular diet of a dog weighing 14 pounds produced diarrhea on the sixth day and death from collapse on the ninth.

Meat extracts of all sorts are concentrated preparations of the toxins of meat. They have no nutritive value and their use cannot be too strongly condemned. Meat extracts are, according to Gautier, fifty times as toxic as broth made from 2 pounds of beef and 5 pints of water. The meat remnants and refuse from which meat extracts are made are always in a state of beginning decomposition. In the extracts, the products of decomposition are found in concentrated form. This is the explanation of the putrid odor always noticeable in meat extracts.

Why Viscera are Especially Objectionable

The viscera of animals are the most objectionable form of flesh foods. All the viscera contain xanthin or uric acid in large amount. Gautier says of the spleen, "This flesh is only a very bad aliment"; and of the kidneys, "These organs are bad when they come from old or carnivorous animals." The

fact that the kidney of a carnivorous animal is always so bad as to be condemned as food naturally leads one to the conclusion that a flesh diet is not conducive to the health of the kidneys. What meat does to the carnivorous animal, it will also do to the meat-eating man.

Blood has from the earliest ages been considered unfit for use as food by the most enlightened nations. The orthodox Hebrew still obeys the injunction given, according to the Bible, to Noah: "The blood thereof which is the life thereof, thou shalt not eat of it." All meat contains blood, and blood puddings are considered a delicacy by some persons!

Bacteriology Condemns Meat as Food

The average eater of meat is quite unconscious of the fact that each juicy morsel is fairly alive and swarming with the identical micro-organisms found in a dead rat in a closet or the putrefying carcass of a cow and in barnyard filth. Meat is made tender by the process of putrefaction and is always kept to "ripen," a process which involves putrefactive changes due to the presence in the meat of the terrible Welch's bacillus, the cause of

gas gangrene; the *Bacillus putrificus*, a common putrefactive organism; the *Bacillus proteus*, a putrefactive germ which causes diarrhea or "summer complaint" in children; and numerous other putrefactive organisms, including various species of *streptococci*, or pus-forming germs, as well as the colon bacillus. The plain truth is that the only difference between meat as eaten by human beings and carrion as eaten by buzzards and hyenas is that the latter is a little farther advanced in the process of decay, but even this small distinction does not always exist. So-called "prime beef" and "high" meats are sufficiently advanced to please the palate of a vulture or a turkey buzzard.

Recently the writer had the pleasure of visiting in his laboratory an eminent bacteriologist, professor in one of the world's greatest universities. In the course of the conversation the writer remarked, for the purpose of eliciting an opinion from the professor: "A bacteriologist ought to oppose the use of meat, because every morsel is swarming with putrefactive organisms, Welch's bacillus, and other pernicious germs which infect the ali-

mentary canal, particularly the colon, and so become the cause of colitis, appendicitis and other diseases; besides producing virulent poisons which damage the liver, kidneys, and other bodily structures in a great variety of ways."

"Yes," said the professor, "as meat comes from the butcher shop, as it is ordinarily eaten by people, it is filled with putrefactive bacteria. I entirely agree with you. *Meat is unnecessary as an article of food and is more or less harmful.*"

Dr. Tissier, one of the most eminent and celebrated bacteriologists of the Pasteur Institute of Paris, for many years assistant of the late Professor Metchnikoff and later his associate, was among the first to make a careful study of the bacteria of the colon. He then made a study of meat, obtaining specimens from the butcher shops. He found every specimen swarming with the bacteria of putrefaction—the very same germs which are found in carrion. Dr. Tissier then went to the slaughterhouse and obtained specimens of meat from the slaughtered animals as quickly as possible after the animal was killed. These

pieces of flesh were put into test tubes and sealed up. Later, when the tubes were opened, the same putrefactive germs were found as were found in the specimens obtained from the meat shops, and the same as are found in the foul bowel discharges of cats, dogs, and men who are eaters of flesh.

Dr. Tissier reports in a paper in which he describes his researches that, although he was as expeditious as possible in obtaining his specimens from the slaughtered animal and sealing them up in glass tubes, he found it impossible to obtain a single specimen free from the germs of putrefaction. They were present in every specimen, although he repeated the experiment many times.

The source of the manure germs with which butcher's meat always teems, is easily found. The bodies of cattle are always soiled with their excreta. In skinning them, the butcher's hands become soiled. After the skin is removed, the soiled hands of the butchers come in contact with the warm, bare flesh and the manure germs with which the meat is thus inoculated rapidly penetrate the whole body of the animal. Bacteriological examinations

have shown that within a few hours after the animal is killed, every part of the carcass is swarming with the filthy germs found in its excreta.

To prevent this would require the same precautions that are taken in performing a serious surgical operation. It would be necessary to shave and disinfect the skin, to cover the butcher's hands with rubber gloves, and to keep the slaughter house as immaculately clean as a modern surgical operating room. And what has been said of cattle is equally true of fish, fowl and game.

As the result of his experiments, Dr. Tissier, for more than twenty years has prohibited the use of flesh foods by his patients. He treats his patients by changing the intestinal flora, accomplishing this by implanting cultures of the protective germs which discourage the growth of putrefactive germs in the colon. These germs are implanted in the infant's intestine within a few hours after birth. Nature starts out in life every young warm-blooded animal, every calf, every kitten, even puppies and chickens, with a stock of protective germs (*B. bifidus* and *B. acidophilus*). So long as

these germs flourish, the animal usually remains in health. Through errors in diet, particularly by the use of meat, these germs are lost. Then autointoxication begins, with all the evil consequences which follow.

Said Dr. Tissier, in reply to a question by the writer regarding the efficiency of buttermilk cultures of friendly germs: "Some people eat beefsteak and then swallow a pint of buttermilk to disinfect it. I am not such a fool. I don't eat the beefsteak."

Dr. Tissier states that he has treated four or five thousand patients by this method with excellent success, after the means in ordinary use had been employed without benefit. Professor Tissier frankly says that these new discoveries give a sound and scientific basis for discarding meats.

Some years ago the writer had the pleasure of spending a few weeks in the laboratory of Dr. Distaso, who at that time was in charge of the bacteriological laboratory of the Royal Institute of Public Health, in London, England, and was consulting bacteriologist to St. Mary's Hospital, London. One day, when the subject of study and discussion was the

pernicious *B. Welchii*, the so-called Welch's bacillus, one of the putrefactive organisms always found in the colons of meat-eaters, the cause of gas gangrene and the chief cause of the foul odors and virulent poisons produced in the human colon, Dr. Distaso remarked:

"All dogs suffer from autointoxication; that is the reason they are so short-lived. They are meat-eaters and of course become infected with the putrefactive bacteria in the meat." Then he added: "Practically all English people also suffer from autointoxication and for the same reason—they eat so much meat." "But do you not eat meat, professor?" the writer asked. "No, indeed. I do not eat meat, neither does my wife nor my children."

At the present time many eminent bacteriologists are giving much attention to the question of changing the intestinal flora; that is, getting rid of the disease germs which cause putrefaction, appendicitis, colitis, and, worst of all, autointoxication, and re-implanting in the colon the normal germs which Nature provides to protect the body against disease—one of the most important of all the natural defenses of the body. Such great progress

has been made within the last few years that it is now possible to change the intestinal flora with certainty and, in the majority of cases, quite rapidly; that is, it is now possible, by the use of the improved methods which have been developed within the last ten years, to drive out the colon bacteria which produce the horrible odors and pernicious poisons generated in this region of the body, and to substitute therefor the harmless acid-forming organisms which form the normal flora of the intestine. This change can often be effected within a few days; and when it is accomplished the change which occurs in the individual often seems almost miraculous. The bad odors disappear from the bowel discharges; if the breath has been malodorous it becomes sweet; a feeling of well-being, almost exhilaration, takes the place of headache, dullness, lassitude, indecision, inability to concentrate the mind, and general ineptitude. The bowels begin to move normally, sleep becomes sound and refreshing, morning lassitude disappears, there is a great increase in vigor and endurance, and the fortunate individual often exclaims, "I feel like a new being." The

lifting from the body of the onerous burden imposed upon it by the task of destroying and removing the great flood of poisons which enter the blood from the colon removes one of the greatest handicaps to which the vital machine is ever subjected. The real size of this burden may be comprehended in some degree by imagining what would happen if the foul material of an ordinary stool were returned into the body. Revolting as the idea is, it is evident that the putrid matter would do no more harm if put back into the body than it was doing before it was discharged.

Ordinary cooking does not destroy these deadly germs; these pernicious organisms are "spore bearers" and on this account are able to survive exposure to very high temperatures. Because of this, meat canners find it necessary to cook their product under steam pressure for several hours at a temperature of 240° F. The ordinary cooking temperature is less than 212° F. Even in roasting the temperature of the interior of the mass of meat is less than 212° F. Any one interested in changing the intestinal flora — getting rid of the mischievous germs which

are more or less implicated in practically all cases of chronic disease—must recognize the utter folly of re-inoculating himself with the germs from which he has labored so hard to free himself. This is exactly what he will do when he returns to the use of meat. A single meal of meat, no matter how tempting to the perverted taste, may be sufficient to restore in full force the pernicious bacteria which are responsible for so many ills. Every morsel contains many millions of these virulent organisms; so a single meal may undo the work of days or weeks of careful effort to re-implant the natural protective organisms (*B. acidophilus*).

The first thing to be done by a person who wishes to eliminate from his body the most active of all causes of chronic disease, high blood-pressure, and premature senility, is to adopt a strict antitoxic dietary; meat should be eliminated from his bill of fare and his diet should be made such that the residues which reach the colon will not encourage the growth of putrefactive germs. The real harm that comes from flesh-eating is not so much the result of the properties of the flesh itself,

as of the changes which take place in the undigested residues of the meat which find their way to the colon.

Mr. Edison tells a story which very well illustrates this principle, which his extraordinarily penetrating and sagacious mind recognized long before the bacteriologists had called attention to it. Mr. Edison, speaking particularly of the importance of care and frugality in diet, stated that when a young man he was taking a vacation trip through the Tennessee mountains and, when passing a wretched cabin in a very barren section, he said to the weather-beaten old mountaineer who sat by the gate; "My friend, what sort of crops do you raise in this country?" "Lor', chile," was the reply, "we raise nothing here. The rabbits have to bring a lunch along when they pass through this country." "That is the way I take care of my colon," said Mr. Edison. "I keep it in such a condition that if a germ gets in there it will starve to death."

In the undigested residues of the meat, more or less of which are always found in the colons of meat-eaters, the meat-eater supplies not simply a lunch, but a sumptuous banquet

for the very germs which Metchnikoff and a whole generation of bacteriologists since his time have labored to find methods to eradicate. At last the problem is completely solved. The bacteriologists have shown us how to change the flora; and when this once has been done, it is only necessary to avoid re-infection to keep the flora changed. To avoid meats of all sorts, even occasionally, is most important.

The Vast Numbers of Bacteria in Meats

The following table shows the number of bacteria actually found in various meats in an examination made in the bacteriological laboratory of the Battle Creek Sanitarium:

	PUTREFACTIVE BACTERIA PER OUNCE	
	When Purchased	After 20 Hours at Room Temperature
Small sausage	19,800,000,000	19,200,000,000
Roast beef	16,800,000,000	22,500,000,000
Round steak	16,800,000,000	25,200,000,000
Large sausage	12,600,000,000	14,700,000,000
Sirloin steak	11,340,000,000
Tenderloin (rare)	5,040,000,000
Hamburger steak	3,870,000,000	21,000,000,000
Pork	3,781,000,000	31,080,000,000
Smoked ham	1,293,600,000	22,500,000,000
Porterhouse steak	900,000,000	21,000,000,000
Tenderloin (well-done) ...	756,000,000

A report of the proceedings of the Society of Biology of Paris (1913) contains an interesting account of a study of meat germs of the sort which produce putrefaction. It was found that these germs grow with great rapidity, spreading over the surface at the rate of five inches in twenty-four hours and, in the same length of time, at a temperature of 100° F., penetrating the meat to the depth of nearly two inches. It is evident, then, that meat which has been kept for two or three days must be penetrated throughout by these germs, since they are always present.

Putrefactive bacteria grow most rapidly at temperatures near blood heat; but these pernicious organisms possess great vitality and grow slowly even at temperatures barely above freezing. Certain molds grow at temperatures below freezing.

According to Weinzirl (*American Journal of Public Health*, 1914) :

The standard of 1,000,000 bacteria per gram, advocated by some as a limit, is apparently too low, since it would condemn nearly all samples of hamburger, when showing no taint or other evidence of putrefaction. *Samples of other market meats, all of which would otherwise pass inspection, often exceed this limit.* [There are 28.4 grams in an ounce.]

A bacterial standard of 10,000,000 per gram is the limit

proposed, on the basis of which 50 per cent of the market samples of hamburger would still be condemned. This is justified on the following grounds: (a) much of it is actually spoiled when it reaches the consumer or is to be cooked; (b) meat teeming with 10,000,000 bacteria per gram is potentially rotten and soon will be actually spoiled under ordinary methods of handling; (c) the fact that markets are prone to add sodium sulphate to hamburger, even though the dealer knows it to be contrary to law, indicates that something is wrong with the hamburger; and (d) finally, if hamburger were made from wholesome meat in the first place, then properly iced, it is believed that the bacterial content could readily be held within the 10,000,000 limit.

Putrefactive Products of Meat

When alive, muscle tissue is tender and fragile; but after death stiffening or *rigor mortis* occurs as a result of the coagulation or clotting of the muscular tissues. It then becomes tough, and it never becomes tender again until putrefaction occurs. It is for this reason that meat is allowed to hang for some time after killing "to ripen" or, in other words, to decay. Gasparé, in 1822, demonstrated the toxic nature of putrefying substances. He showed that putrid substances contain poisons which are much more deadly than the excretory products of the body.

Experiments reported by Farger and Walpole (*Journal of Physiology and Pathology*)

show that putrid meat contains many poisonous substances, some of which cause rise of blood-pressure. This is why the up-to-date physician forbids the use of meat by persons suffering from apoplexy or arteriosclerosis or from high blood-pressure. This restriction is necessary not only because of the poisons always in meat from putrefaction which has already taken place, but because of the further putrefaction of undigested remnants of the flesh which takes place in the lower part of the small intestine and the colon.

Bailey (Fitch, *Dietotherapy*) very wisely calls attention to the danger of eating high meats, as follows:

The habit of hanging game until it gets *high* is quite objectionable and decidedly unhygienic. When it is hung up for this purpose and allowed to become malodorous, putrefaction is already well under way. This process of decay not only rapidly leads to decomposition and the development of toxins, but is a genuine hotbed for micro-organisms which may cause gastric troubles and enteric disorders. Such practices, which are bound to endanger the health even of the most robust, should be condemned.

High game, on account of the toxic substances it contains, is even more dangerous to the circulatory system; the toxins contract the small blood vessels and thereby put extra work upon the heart. For this reason, in critical cases of cardiac

affection and high blood-pressure and in Bright's disease, it should not be eaten.

When meat is stale or game is "high," the fact is positive evidence that putrefactive changes have taken place by bacterial action, whereby certain alkaloidal substances of the nature of ptomaines and leucomains of an exceedingly poisonous nature are formed. When such food is ingested and absorbed, serious and even fatal results often follow.

The eating of putrid flesh is always dangerous: in certain cases immediately so; in others, the injury appears later. Decaying flesh is always infested with the germs which may produce gas gangrene, suppuration, peritonitis, pneumonia, abscess, and other deadly disorders. When introduced into the intestine, these germs fix themselves upon the intestinal wall and become permanent inhabitants which are even more difficult to get rid of than Canada thistles in a pasture lot. They take deep root and spread. They invade the appendix and cause appendicitis. They cover the walls of the colon and cause colitis. They work through the wall and produce adhesions, even inflammations of kidney and bladder. They work slowly upward in the small intestine and finally reach the gallbladder, causing gallstones. They may be the cause of

gastric or duodenal ulcer. They become a serious menace to the entire body through the poisons which they form. The writer has met many cases in which a single meal of cold storage chicken or duck or other game, long dead and neglected to be buried, has been the cause of many years of misery and invalidism.

Thus the popular practice of keeping meat until it becomes prime, or ripe, is in the highest degree reprehensible. It is important that the fact should become well known and understood that this so-called process of "ripening" is in no way different from a process of putrefaction. Decomposition begins within a few hours after death, and progresses more or less rapidly according to the temperature to which the body of the animal is exposed. At a low temperature (40° F.) decomposition proceeds slowly, but nevertheless it proceeds. The character of the bacteria which develop at a low temperature is somewhat different from those which grow at a high temperature, but toxic products are produced in both cases.

"Flesh and meats kept for a length of time

undergo the influence of bacterial growths, changes which render them toxic. . . . The digestive tube of man is much more sensitive to these poisons than that of animals. . . . Meats which are slightly putrid produce in human beings gastro-intestinal disorders, while perfectly well tolerated by carnivorous animals, and even by animals which are not naturally carnivorous" (Roger).

The worst effects, however, are the more remote consequences which result from the continued introduction into the intestine of these poisons and the germs which produce them. To infections of this sort must be attributed, in the writer's opinion, a large portion of the great number of cases of intestinal autointoxication which are now recognized in every civilized country. Professor Brouardel, an eminent French physician, reports a case in which a number of persons suffered seriously after eating of stuffed goose.

One of the persons, a woman suffering from chronic disease of the kidneys, died, evidently because the kidneys were not able to cope with the great quantity of enterotoxins which

entered the blood from the intestine. There can be no doubt that the lives of many persons suffering from chronic renal and lymphatic diseases are cut short in a similar way. The writer has in mind at the present moment a number of cases in which persons suffering from chronic renal disease have by a single indiscretion in eating a hearty meal of meat brought on a fatal relapse.

"Sausage often contains great numbers of ptomaines and microbes; hence if not well cooked it is very likely to cause serious poisoning. Sausage contains all forms of noxious substances" (Roger). Muller reports 265 cases of poisoning from sausage, in which the symptoms generally began after an incubation period of about eighteen hours. The first symptoms were weakness, exhaustion, nausea, vomiting, diarrhea, dryness and burning of the throat. Two or three days later worse symptoms appeared; as vertigo, staggering gait, difficult respiration, double vision, difficulty in swallowing, hoarseness, clammy skin, paralysis of the legs, collapse, and death. In some epidemics one-third of the cases are fatal.

"Decomposing meats [comprising practically all butcher's meat] are full of toxins and bacteria which find in the intestines excellent conditions for their development" (Roger). The poison produced by the *Bacillus botulinus* is extremely deadly. Less than one ten-thousandth part of a drop of a culture of this germ was found sufficient to kill a mouse. "For efficient destruction of the bacteria found in them, meats must be heated to a temperature of 248° F. for two hours" (Roger). This is seldom done. In fact, it is quite impracticable in the ordinary cooking of meat.

"Fish are still more likely than the flesh of other animals to give rise to poisoning" (Roger). This fact has long been known. It was on this account that Alexander the Great forbade his soldiers to eat fish. The tissues of some fish contain a poison similar to *curare*, an "arrow poison" of certain savage tribes. Other fish have poison glands, so that their bite is as poisonous as that of a venomous snake. Roger gives a long list of poisonous fish. The late Professor Brieger, as well

as others who have made a careful study of this subject, isolated numerous ptomaines which are found in the flesh of fish. Even in a fresh state it is known that the sturgeon contains various toxic alkaloids. In Russia, where many persons live largely on sturgeon during Lent, poisoning from this source is often observed. Anrep reports the death of five persons from the use of salted sturgeon. Fish become poisonous at certain times or in certain places because of the noxious character of the food on which they live. This is the case with fish living in the vicinity of coral reefs. Cases of poisoning have been noted in France from the use of sardines, salmon and codfish. The so-called red cod owes its color to a chromogenic (color-producing) microbe which is associated with poison-producing bacteria.

Virchow reported an epidemic in which nineteen persons were made sick, four fatally, by eating mussels. Mussels habitually gather poisons from the waters in which they live. According to Roger, shellfish are a dangerous diet. He says: "Even healthy mussels are

not a good food. Their prolonged use seems to be capable of producing chronic poisoning and cirrhosis of various organs. These effects have been observed in the natives of Terra del Fuego, who daily consume several kilograms of mussels."

Typhoid fever germs have many times been found in oysters, and numerous epidemics of typhoid have been traced to their use. Simon reports a case of poisoning through the eating of lobsters. Rapin reports an epidemic of severe illness from eating crabs. One of the sufferers died at the end of twenty-three days from symptoms resembling typhoid fever.

All these creatures—oysters, clams, mussels, lobsters, crabs—are scavengers and quite unfit for food.

An eminent sanitary authority states that hamburger steak may contain 850,000,000 bacteria to the ounce. Ten million bacteria per gram may be said to be equivalent to 300,000,000 bacteria per ounce. The significance of this will be appreciated when it is remembered that certified milk is not permitted to contain more than 10,000 bacteria per gram,

or 300,000 per ounce; that is, marketable hamburger steak may contain a thousand times as many bacteria as certified milk. Milk which contains as many as 200,000 bacteria per cubic centimeter, or 6,000,000 per ounce, is regarded as unmarketable, and is promptly condemned wherever a milk inspection service is maintained, while at the same time hamburger steak containing fifty times as many bacteria is sold and eaten without protest.

It is to be also noted that the bacteria of milk consist almost wholly of harmless lactic-acid-forming organisms, or sour milk germs, while the bacteria of meat consist almost exclusively of putrefactive organisms such as the Welch bacillus, the cause of gas gangrene, the *Bacillus putrificus*, the *Bacillus proteus*, and other bacteria which are usually present in carrion or putrefying animal bodies.

A research carried on by the meat committee of the Food Investigation Board of Great Britain has shown that the fungus which produces black spot on cold storage meats will grow at a temperature 9° F. below freezing.

Numerous other molds have been found which grow well at the freezing point.

It remains further to be said that all fresh meat is eaten in a state of decay. The process may not have proceeded so far that the obtuse human nose can discover it, but a carrion bird or a carrion fly can smell it from afar, and various scavenger creatures will quickly show their appreciation of the unsavory tidbit if the arch scavenger man does not get the start of them by an hour or a day. Indeed, the putrefactive bacteria always found in meat in countless numbers, smoked and salted meats as well as fresh meats, are scavenger parasites which play in nature the important role of reducing back to the soil the dead bodies of animals. Another and quite different class of bacteria, for the most part harmless, perform this office for plants.

Falk and McGuire have recently perfected a new method of testing meat for decomposition by the aid of Folin and Bell's test for ammonia, and have found that, while very fresh meat may not contain more than one-fourth grain of ammonia to the pound, within twenty-four hours the amount may be

three times as great, representing four grains of putrefied protein. At room temperatures (60° to 70° F.) the ammonia increases very rapidly, becoming within twenty-four hours ten to fifteen times as much in amount as in fresh meat, and tainting the meat to such a degree that it becomes too offensive to the taste and smell to be eaten. Such meat, however, is often eaten in restaurants and by gourmands who have acquired a penchant for what the French term the *haut gout*. By the addition of strong seasoning the flavors of decomposition may be concealed, and this is one of the fine arts of our modern restaurant cuisine.

The ordinary test for the wholesomeness of meat is "its flavor, odor, and appearance when uncooked." This is not sufficient to distinguish fresh from putrefying meat, since the sense of smell in different persons differs in sensitiveness, and there are even those who have acquired a liking for the flavor of decay. It is important that this new test should be put into general use and that all meats found to contain an appreciable amount of ammonia should be rejected. Even if not of-

fensive to the taste and smell, the putrefaction products are pressure-raising poisons, and the putrefactive bacteria infect the intestinal tract even when not present in sufficient numbers to render their presence obvious to the sense of smell. The general use of this test would speedily lessen the consumption of meats, as it would result in the condemnation of practically all market meats.

All flesh, then, as eaten, is to some degree unsafe. Ordinary cooking does not destroy the germs of meat. They are killed only by a temperature of 240° F., and the usual cooking temperature is less than 212° F. Even roasting will not destroy these germs for the oven heat does not penetrate to the interior of the "roast." Eaters of meat are thus continually inoculating themselves with putrefactive bacteria which find in the colon, in addition to putrescible mucus, fragments of undigested meat, which supply a most favorable nutritive medium. The stools of meat-eaters always swarm with putrefactive bacteria and have a putrid odor. This explains the strong putrescent odors connected with the lion's cage in the menagerie and the absence of these

odors from the pen of the deer or the stall of the ox. Herter and Bouchard found that the stools of carnivorous animals and mixed feeders are highly poisonous, while those of vegetable feeders are either non-poisonous or only slightly poisonous.

Why Physicians Forbid Meat in Cases of Kidney Disease and High Blood-Pressure

The poisons resulting from the putrefaction of the undigested residues of flesh foods in the colon are without doubt the chief cause of ordinary chronic intestinal toxemia, or autointoxication, which is practically universal in meat-eating countries. The influence of these toxins in causing and aggravating chronic disease of the kidneys, high blood-pressure, arteriosclerosis, and other degenerations, is well known to all experienced physicians, and it is for this reason that the use of meats is by all up-to-date physicians either greatly restricted or wholly forbidden in these cases.

The use of a flesh diet imposes upon the kidneys a large amount of extra work which must lessen their efficiency and gradually lead to degenerative processes which make their

presence known by albumin and other evidences of kidney disease. More than two-thirds of the meat eaten by the mixed feeder is at once eliminated by the kidneys as waste matter and serves no useful purpose in the body. Meat contains much uric acid, which the liver of man is unable to convert into urea as does the liver of a dog or other carnivorous animal, a strong argument in favor of the biologic diet.

In prohibiting the use of meat in cases of kidney disease, the physician does not, of course, expect that the disease will be cured but only that the patient's funeral will be postponed. And the conclusion is easily reached that the funeral might be still more effectively and certainly postponed if the patient had ceased the consumption of flesh before the appearance of Bright's disease.

Here is to be found an unanswerable argument in favor of the non-flesh dietary. The surest cure for any disease is to prevent it; and no better measure of prevention can be found than such means as will arrest the disease after it has once become active.

Squier and Newburgh, of the University

of Michigan, continuing experiments begun in 1919 on animals, in which they demonstrated that Bright's disease may be induced in rabbits by a high protein diet, have recently demonstrated similar effects in human beings. They showed that a high protein diet may cause the appearance of blood in the urine of healthy men; that in persons whose kidneys have been damaged by disease, a high protein diet causes the appearance of blood cells and albumin in the urine; and that edema, or dropsy, and changes in the eye characteristic of Bright's disease, are aggravated by a high protein diet.

These investigators maintain that a high protein diet in man causes irritation of the kidneys.

How Flesh-Eating Causes Constipation

The general poisoning, or autointoxication, which inevitably results from flesh-eating, is greatly aggravated by the constipation which is also one of the natural consequences of a flesh diet, partly because the flesh diet is lacking in the roughage or indigestible material necessary to furnish the bulk required to stimulate the intestine to action.

A still more potent cause of constipation is to be found in the alkalinity of the intestinal contents when putrefaction occurs, as the result of the considerable quantities of ammonia produced. The contents of the colon are normally slightly acid as the result of fermentation. The lactic acid thus formed is the normal stimulant of the colon, exciting its muscular walls to contraction. The ammonia and other alkaline substances resulting from putrefaction have the opposite effect, paralyzing the colon, thus producing the so-called atonic constipation.

Putrid stools are usually alkaline. If the individual himself is not conscious of constipation, he is suffering from incomplete emptying of the colon, even though regular daily movements may occur; and there is usually present an incompetency of the ileocecal valve, which permits the accumulated putrefying residues in the colon to back up into the small intestine, where the products of putrefaction are quickly absorbed, giving rise to bilious attacks, headaches, loss of appetite, sleeplessness, skin eruptions, and the numer-

ous other symptoms of chronic autointoxication.

One of the most obstinate of all forms of constipation is that known as "spastic" constipation, which results from colitis, one of the direct consequences of infection with "meat bacteria."

DISEASES DUE TO FLESH-EATING

Animals are so like human beings in their structure and functions that they are more or less subject to the same maladies. Domestic animals suffer from constipation, indigestion, fever, jaundice, gallstones, kidney stones, neuritis, paralysis, arteriosclerosis, skin diseases, obesity, nervousness, insanity, and many other ailments to which human beings are subject. Who can say, for example, that a horse or an ox or even a slop-fed pig may not on occasion experience the same distressing inconvenience from headache, backache, neuritis, or neuralgia from which human beings suffer?

The idea of a "biliary" beefsteak, a dropsical roast, a rheumatic joint of veal, a "torpid" pig's liver, or a jaundiced chop is, to say the least, not inviting; yet in the eating of animal flesh one never can know that he has not swallowed something tainted by disease. And, indeed, it is well known to sanitarians that animals often suffer from diseases which are directly communicable to human beings.

through the eating of their flesh. For example, trichina and tapeworm, two horrible parasites, are never acquired in any other way than by the eating of flesh. Tapeworm is usually derived from beef, and trichinæ almost universally from the eating of pork. Of animals eaten by human beings, the hog, the barnyard fowl and fish are the only ones which include flesh in their bill of fare. Trichinæ are usually acquired by the eating of pork in the form of ham or sausage; more rarely from the flesh of fowls and possibly from fish.

Among other diseases which may be acquired directly from the use of flesh, sanitary authorities enumerate the following: Tuberculosis, anthrax, aphthous fever, cow pox, glanders, actinomycosis, typhoid fever.

Tuberculosis in Animals

The most important of these diseases of animal origin is tuberculosis, to which all domestic animals are more or less subject, particularly cattle, hogs, and barnyard fowls.

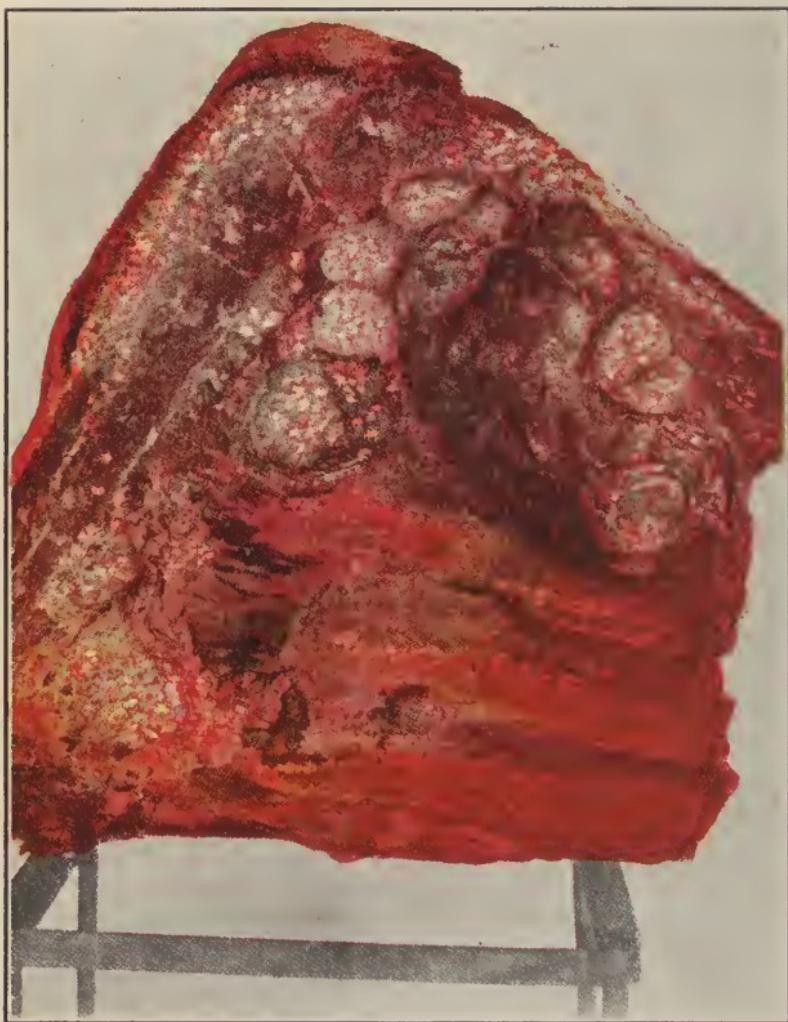
All so-called food animals are liable to infection. According to Littlejohn, in a paper read before the National Tuberculosis Con-

ference of London, 20 to 30 per cent of English cattle are tuberculous. Old milch cows (ten to fifteen years) are infected to the extent of 75 per cent; pigs, 4 to 5 per cent. Birds, including turkeys, ducks, and pheasants, as well as chickens, are also infected. Sheep, goats, and rabbits are rarely infected naturally, but rabbits are very susceptible to experimental infection. Horses are tuberculous only to the extent of one per cent. In the middle states of this country, cows are believed to be generally infected to the extent of about 10 per cent. In some parts of the country 25 per cent of the cows are infected. When slaughtered, the carcasses of these tuberculous cattle are usually placed on sale in the meat markets along with other meats.

According to Dr. Kiernan, of the United States Bureau of Animal Industry, out of 14,000,000 cattle and hogs slaughtered in the year ending July, 1917, 3,397,000 (nearly one-fourth) were found to be infected with tuberculosis. The disease is spreading so rapidly that Dr. Kiernan believes that 90 per cent of all the herds in the country will soon be infected if vigorous measures to check the



TUBERCULOUS BEEF. INNER SURFACE OF CHEST



TUBERCULOUS BEEF. ENLARGED GLANDS

extension of the disease are not speedily adopted.

Hogs and chickens become infected by eating the milk of tuberculous animals. Careful inquiry has shown that tuberculosis is prevalent among animals to practically the same degree as among human beings living in the same region. Tuberculosis is becoming increasingly prevalent among hogs, due to the extensive feeding of skim milk from creameries. Hogs and chickens are often fed the carcasses of animals which have died of disease and thus are readily infected by tuberculosis when this is present.

According to the *Journal of the American Medical Association*, inspection of fowls has received little attention from the United States government, probably for the reason that a very large force of inspectors would be required to examine every dressed chicken sent to the market. It is doubtless true, as suggested by this journal, that "almost any housewife would notice marked tuberculosis in the livers of poultry being prepared for the table and would reject the diseased parts." But it is also very unlikely that the average

housewife would recognize the significance of the appearances characteristic of early tuberculosis or would know of the danger involved in the eating of such flesh; besides, the idea of eating any part of a consumptive hen is by no means appetizing.

Mr. H. R. Smith, in the *American Journal of Veterinary Medicine*, informs us that the report of the United States bureau of animal industry for 1921 shows that one out of eight of all the hogs in the United States is affected with tuberculosis. During the year ending June 30, 1921, more than 54,000 hogs slaughtered in Chicago were found so badly affected with tuberculosis that they were rejected as unfit for food, while seven times as many other hogs, also found to be infected by tuberculosis, were condemned in part, a portion of the carcass being passed by the inspectors to be used for food, although other portions were the seat of visible disease.

Tuberculosis is rapidly increasing among hogs, having increased one-fourth since 1907. It also seems to be increasing among fowls. According to Smith, tuberculosis in cattle, hogs, and fowls, the so-called *bovine form*, is

responsible for about 50 per cent of all cases of tuberculosis in human beings.

Geese and pigeons are also subject to tuberculosis. "Go light" is a term applied by poultry keepers to fowls suffering from tuberculosis. The fowl's comb becomes light-colored, the bird loses weight, and often stands in one position with the head close to the body and the tail feathers down. In fowls, the spleen is the chief seat of the disease. Other abdominal organs are also affected, and sometimes the lungs and joints. It is probable that many thousands of tuberculous fowls as well as tuberculous pigs are annually consumed, as efficient meat inspection is enforced in but few places in the United States. As a matter of fact there is no really efficient meat inspection anywhere.

If, as Smith estimates, half of all cases of tuberculosis would be prevented by the extermination of the disease in animals, it is evident that flesh-eating is responsible for many of the deaths which occur from this disease. The annual number of deaths at the present time in the United States is more than 150,000, from which it appears that 75,000

deaths occur annually as the result of tubercular infection of animal origin. Doubtless milk from tuberculous cows is responsible for a certain proportion of these deaths. But when we consider the large amount of tuberculous pork which is eaten, much of it in a raw state, and add to this the fact that a large part of the milk now used, especially in the large cities, is pasteurized, eliminating the danger from tuberculosis, it seems not unfair to attribute to meat alone not less than one-sixth the total number of deaths from tuberculosis, or 25,000 annually.

If it were definitely known that spinach, ripe olives, prunes, pears, peanuts, or almost any other single article of vegetable food was directly responsible for the death of 25,000 people annually, such a hue and cry would be raised against the sale and use of the article that it would be quickly eliminated from the national bill of fare.

According to Smith, not less than 7 per cent of all the hogs eaten in this country are tuberculous; that is, of the 37,700,000 hogs killed in this country annually 2,639,000 are tuberculous and liable to be a source of in-

fection. Pork is particularly dangerous from this standpoint for the reason that it is so often eaten raw or slightly cooked. Since tuberculosis has increased among hogs to the extent of 25 per cent within the last fifteen years, it may be fairly held that the number of deaths due to tuberculosis from this source has increased in like proportion. It seems utter folly to be giving so much attention to the purity of the water supply, efficiency in plumbing, sewerage, and other matters of public sanitation, while permitting the great packing houses of Chicago and elsewhere, and meat shops all over the country to send into the average American home every year not less than 12 or 13 pounds of tuberculous pork, to say nothing of the thousands of tuberculous pullets, which without doubt exceed in number the tuberculous pigs.

Cancer from Meat-Eating

Williams, the English authority on cancer, has shown that cancer is a disease of meat-eating races of men and animals, which was also shown to be true of appendicitis by Senn, of Chicago, and Lucas-Champonnière, of

France. Cancer is practically unknown among the vegetable-eating natives of Central Africa, although negroes from this region who become addicted to flesh-eating by contact with whites, either on the African coast or in this country, soon show great susceptibility to the disease. The disease is increasing rapidly in all civilized countries. Hoffman, statistician of the Prudential Life Insurance Company, has also shown that cancer increases with the consumption of flesh.

Cancer is rapidly increasing in all flesh-eating countries, but most rapidly in countries where flesh is very largely used, as in Australia. In this country, at the present time 300,000 people suffer from cancer continually, and 75,000 die of this horrible disease every year. One-seventh of all women who reach the age of forty years die of cancer.

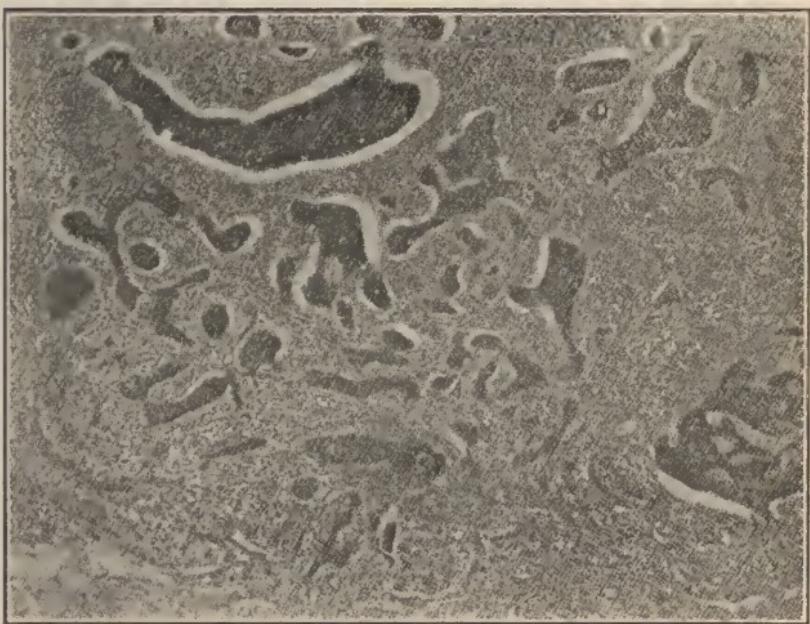
Cancer has been reported by various authorities as being found in different animals in the following proportions:

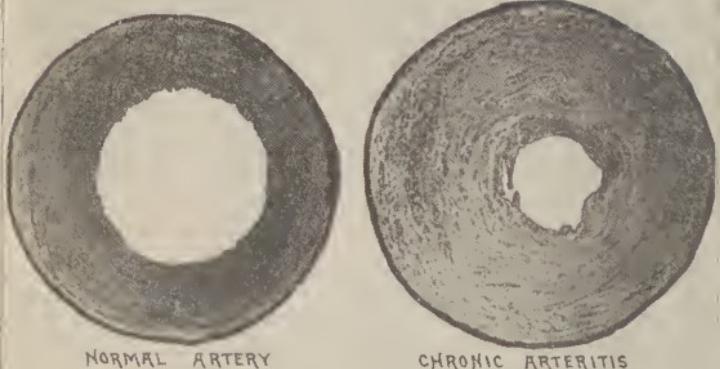
Sheep	one in 6,800
Horses	one in 2,100
Cattle	one in 358
Man	one in 20
Rats	one in 5
Apes	none

CANCER IN COW



CANCER IN MAN





SECTIONAL VIEW OF A HEALTHY ARTERY AND
ARTERIOSCLEROSIS

Dr. Charles Mayo states that investigations made in the research laboratory of the Mayo Clinic have shown that of dogs under eight years of age, one-fourth suffer from cancer; of dogs ten or twelve years of age, one-third have cancer; and of dogs fourteen years or over, one-half are cancerous.

Cancer Rare and Appendicitis Unknown Among Flesh-Abstainers

Dr. Fred E. Burnham, brigadier-general in the British Army, writes to the *British Medical Journal* (May 13, 1922) from Scutari, Albania: "During the past year I examined, operated on, treated, or prescribed for, 20,133 patients who attended the Ambulance or the White Cross at Scutari. The negative finds were no less interesting than the positive. There was one case of carcinoma. Among this large number of patients I found no case of appendicitis."

The natives of Albania rarely eat meat. Their diet consists of fresh vegetables, boiled wheat, bread, and dairy products. They are among the most vigorous and sturdy people in the world. These people give great care to

the bowels, habitually evacuating the colon three times a day. This is the natural intestinal rhythm with persons who live upon a non-flesh dietary. With flesh-eaters, there is putrefaction of the undigested remnants of meat in the colon, which results in the production of the poisons which paralyze the bowel, and thus leads to constipation, colitis, and ultimately appendicitis through extension of the infection of the colon into the appendix.

Dr. Senn, after an extensive study of the diseases prevalent among the natives of the east of Africa, reported that he found no cancer and no appendicitis among the non-flesh-eating tribes of this part of Africa. Dr. Cole, a physician in charge of a mission hospital in Natal, after thirty years' experience, reported that he had seen only one or two cases of cancer and two or three cases of appendicitis.

Meat-Eating Causes Disorders of Nutrition

At a joint meeting of the leading medical societies of Paris, held in 1904, M. Bardet, a distinguished member of the Society of Medicine and Practical Surgery, called at-

tention to the great evils arising from the free use of flesh foods. He expressed the opinion that this practice is the fundamental cause of nearly all the maladies of nutrition, which have increased so rapidly within recent years. In this opinion he concurred fully with M. Bascault, who had made a special scientific investigation of the question. M. Bardet, although an advocate of total abstinence, even went so far as to declare that "albuminism" resulting from the excessive use of foods rich in protein is much more dangerous than alcoholism, for the reason that the drunkard alone takes alcohol to a dangerous excess, and is well aware that he is doing himself an injury, while nearly all human beings take an excess of food, especially of protein, under the supposition that in so doing they are increasing their capacity for work and contributing to the welfare of the body.

Acidosis from a Flesh Diet

Gautier calls attention to the fact that oxalic acid and other poisonous acids are among the products of the oxidation of flesh foods in the body. "On a flesh diet these toxic

bodies accumulate and acidify the blood, excite the heart, and intoxicate the subject, disturbing the functions of the skin, lungs, liver or kidneys." "Oxybutyric and other oxy-acids," says Gautier, "appear to be derivable from a direct or indirect splitting up of the albuminoids. . . . Oxybutyric acid and oxalic acid are toxic, acidifying the fluids of the body and preventing the action of the oxidizing ferments which require an alkaline medium. Hence, there is a veritable acid cachexia or acidosis, the origin of joint disease, arthritism, and a large number of diseases due to retarded nutrition."

A Meat Diet and Scurvy

A weighty physiological argument against the consideration of flesh foods as a normal and proper diet for human beings is the fact that meats as eaten are lacking in certain of the essentials of a normal diet. For example, even uncooked meat is almost altogether lacking in the antiscorbutic or scurvy-preventing vitamin. Says the *Journal of the American Medical Association* (June 24, 1922):

The fact that scurvy is not peculiarly prevalent among the peoples of the Far North living for the most part on ani-

mal food, who rarely have available those vegetable products which are prized as antiscorbutics, has been the subject of considerable discussion of a long-known disease. Those investigators who have tested the protective power of meat against scurvy on the classic experimental animal, the guinea-pig, have almost without exception failed to demonstrate any antiscorbutic potency in muscle tissue. . . . The experimental investigations of Vedder,¹ of the United States Army, at Fort Sam Houston, Texas, corroborate the previous guinea-pig tests in showing that the administration of considerable amounts of erythrocytes (red blood cells), voluntary muscle, heart muscle, and bone all failed to prevent the development of scurvy, or even to prolong the depletion period. The antiscorbutic factor is not present in these tissues in appreciable quantity.

It should be added, however, that further experiments have shown that the liver, lungs, spleen, brain, and some other viscera contain the special element which prevents scurvy. The *Journal of the American Medical Association* further tells us that "Vedder states that when the plains Indian had been without game over a considerable period, he was accustomed to open the freshly killed bison and eat handfuls of raw liver. It is stated that the Eskimos make a special effort to secure

1. VEDDER, E. B.: The Etiology of Scurvy, IV Observations Concerning the Physiologic Action of the Antiscorbutic Vitaliment, Mil. Surgeon, 50: 534 (May), 1922.

the liver of the seal, and that when hunters have Apache Indians as guides, the guides take all the insides of the deer, leaving the meat for the hunters."

It appears, then, that in order to make use of meat as a staple article of diet it will be necessary to follow the example of the plains Indians, the Eskimos and other savage tribes, who eat practically the whole animal, not simply the lean parts or muscle tissue but the viscera as well, including those parts which are commonly considered offal. The repulsiveness of such a diet would be a sufficient antidote for any tendency toward its popularization.

Meat-Eating and Arteriosclerosis

The results of an interesting study of arteriosclerosis in the lower animals have recently been published by Dr. Herbert Fox, director of the Laboratory of Comparative Pathology, Philadelphia Zoological Garden. Among the observations made by Dr. Fox is that the glands of internal secretion, the pituitary, adrenal, and thyroid glands, are larger in cats, dogs, and eagles (flesh-eating animals)

than in lemurs, rodents, and rabbits, animals that live on fruits, nuts, and tender shoots.

Dr. Fox also observed that arteriosclerosis is found more definitely developed in animals living upon a high protein diet and hence subject to autointoxication. Arteriosclerosis is found much less frequently in lower animals than in human beings, doubtless because, on the whole, animals live more physiologically than do human beings. It is quite possible, also, that another cause may be that, with the exception of pets and menagerie animals, domestic animals are usually killed when young or almost as soon as maturity is attained so that they may be utilized as food, horses and dogs being the principal exceptions to this rule. An interesting contrast was found between horses and dogs in the fact that it is doubtful whether arteriosclerosis ever occurs in horses, although they often attain very great age, while in the case of dogs arteriosclerosis is comparatively frequent.

A sufficient cause for this difference is found in the difference in diet. Horses are herbivorous; dogs, carnivorous. A meat-eating or carnivorous man exposes himself to the

same causes of arteriosclerosis as those to which the meat-eating dog is subjected. This fact is so well known that it has become the universal custom among practical physicians to exclude meats, meat extracts, and broths of all sorts from the diet of patients suffering from arteriosclerosis, as the most efficient means of checking degeneration of the arteries and the accompanying disease of the kidneys and other viscera.

The Pernicious Effects of a Meat Diet Experimentally Proven

The actual experimental proof that meat is an unwholesome article of diet and the cause of hardening of the arteries and other changes associated with senile decay is at last in evidence.

For several years Dr. L. H. Newburgh, a professor in the Medical Department of the University of Michigan, has been engaged in a research to determine the effects of a high protein diet or, to be more specific, the effects of the feeding of meat to rabbits. The first report of the results of these experiments was published by Dr. Newburgh more than two

years ago. At the meeting of the American Medical Association held at St. Louis last May (1922), Dr. Newburgh presented a report of the further results which he has obtained in this most interesting study, which show beyond any chance for controversy that the free use of meat is a very active cause of degeneration of the arteries or arteriosclerosis.

The meat was given to rabbits in the form of bread made of wheat flour and meat powder. The rabbits were divided into two groups, one of which received bread containing 36 per cent of protein (chiefly meat) and the other 27 per cent. The bread for the latter group was made of equal parts of flour and wheat bran, with which the lean beef powder was mixed. The rabbits were healthy animals, having been raised out-of-doors. In order to make sure that the diet alone was the cause of the results obtained, a control group of rabbits was kept in the laboratories under the same conditions as those receiving the experimental diets, but were given no meat.

Of ten animals fed on bread containing 36 per cent protein (chiefly meat) two, or 20 per

cent, showed disease of the blood vessels within four to eight weeks. Of six animals that lived from ten to sixteen weeks on the same diet, four, or 66 per cent, showed disease of the blood vessels. Of eight other animals that lived from eight to thirty-six weeks on the same diet, every one "showed marked and extensive atherosclerosis; that is, all these animals showed the blood vessels extensively hardened with chalky deposits." Summarizing the results, it appears that of twenty-four animals fed on bread containing about one-half its weight of lean meat fourteen, or 58.3 per cent, developed arteriosclerosis in less than eight and a half months.

Of the animals fed on bread containing about one-third its weight of lean meat, out of eleven that lived more than six months eight showed typical arteriosclerosis, and in seven the changes in the arteries "were advanced and extensive."

Not one of the animals kept in the laboratory under the same conditions as the experimental animals showed any evidence of disease of the arteries, although two-thirds of them lived more than six months.

It thus appears that the larger the amount of protein received by the animals and the longer the duration of the experiment the greater was the destructive effect upon the arteries. It is quite possible, also, that the group which received the smaller amount of meat were also benefited by the bran which they received, which would naturally lessen constipation and hence diminish the toxic effects of the meat. Dr. Newburgh tells us in his article that a careful microscopic examination showed that the changes in the blood vessels of the rabbits were identical with those found in the arteries of human beings in cases of arteriosclerosis.

It is notable that the amount of meat eaten by the rabbits was no greater than that which is habitually eaten by many persons, at least by those who try to follow the teachings of Woods Hutchinson (the number of which, let us hope, is not very great). Indeed, the proportion of protein given to the rabbits was not much greater than that required in the Atwater ration. In this connection it is interesting to note the fact that Atwater himself died of arteriosclerosis after having lived for

two or three years a completely helpless, imbecile paralytic. It is also to be remembered that Hall, Peary, and Shackleton, three noted Arctic explorers who adopted the meat diet of the Eskimos, died early from the results of changes in the blood-vessels.

The fact that meat produces changes in the blood vessels of rabbits is especially significant, as pointed out by Dr. Newburgh, because "spontaneous atherosclerosis [arteriosclerosis] is a very rare disease in rabbits."

In the discussion which followed Dr. Newburgh's paper before the American Medical Association, Dr. Lyon remarked:

"I think anatomical and zoological investigations in human beings would establish the fact that men have had a rather high protein diet for many generations and have become accustomed to it; whereas, the rabbit is one of the most strictly herbivorous animals known. It is even more strictly herbivorous than many of the true rodents. The real origin of rabbits is probably from some pre-ungulate ancestor. It seems to me that it might be advisable to try the experiments on an animal which has a diet much more like

that of human beings than a rabbit, such as the ordinary hog. The hog has probably been eating a protein diet for a long time. I think there are few hogs in the wild or the domestic state that will not eat much protein if they can get it. I doubt that we should conclude that we can produce arteriosclerosis in ourselves by a protein-rich diet, despite these experiments which have been performed so carefully. I do not doubt that Dr. Newburgh does produce it in rabbits, but I think we should be cautious in applying this observation to man."

In closing the discussion of his paper, Dr. Newburgh fully answered this criticism by reference to the observations of Fox, remarking: "Dr. Fox, of Philadelphia, has examined all the animals that have died in the Philadelphia Zoological Garden. His conclusions are of interest in this connection. He pointed out that the carnivora had chronic vascular and renal lesions, and that they were practically the only ones that had such lesions. I wrote to Dr. Fox, asking him whether I was justified in assuming that definite relationship existed between the carnivorous diets and

these chronic lesions of the arteries and kidneys. In his reply, he stated that this was certainly true, that the meat-eating animals showed a high incidence of chronic disease of the arteries and the kidneys as compared with all the other animals on which he had performed necropsies."

Dr. Lyon was right about the hog. He will eat anything given him, including dead horses, even dead hogs, any sort of carrion he finds lying about, for he is a natural-born scavenger. Dr. Lyon is also, we are sorry to say, correct in his claim that the diet of the hog is "much more like that of human beings than that of the rabbit." But that is just the point of interest. Should a man eat like a hog or like a rabbit? Or, if not like a rabbit, is there some other animal, such as the chimpanzee, for example, whose natural diet furnishes a safe model for man to follow? The comparative anatomists tell us that man belongs to the family of primates, a class which includes all the big apes. This clearly indicates him to be a low protein feeder, entitling him to the same immunity from arteriosclerosis which Dr. Fox has shown to be en-

joyed by the non-flesh-eating animals. However, when a man adopts the diet of a carnivorous animal he must expect to suffer the natural consequences of high protein feeding, one of which is early senility through degeneration of the blood vessels and the kidneys. As regards immunity through long use of the high protein diet, it is clearly evident that if carnivorous animals like the dog and the lion have not developed such an immunity it would be futile to expect a natural vegetable feeder like man to develop immunity, no matter how long or to what extent he may have practised meat-eating.

Recognized Meat Contraindications

Albu, an eminent German authority, so long ago as 1901 (*Berl. klin. Wchnschr.*) recognized the injurious effects of a flesh diet, especially in maladies dependent upon intestinal putrefaction, and prohibited its use in the following conditions: neurasthenia, neuroses of the stomach, and especially hyperacidity, mucous colitis, chronic constipation, obesity, exophthalmic goiter, renal diseases, and affections of the skin which are associated

with disturbances of metabolism such as pruritis, furunculosis, urticaria, erythema, exudativum multiforme and nodosum, as well as various forms of eczema, diseases affecting the blood; diseases of the gastro-intestinal tract.

Parasites of Meat

Ambroise Paré, the famous French surgeon, more than three centuries ago gave the advice that meat should be boiled to kill parasites, but his warning has usually been neglected. According to Stiles, professor of zoology, United States Public Health Service:

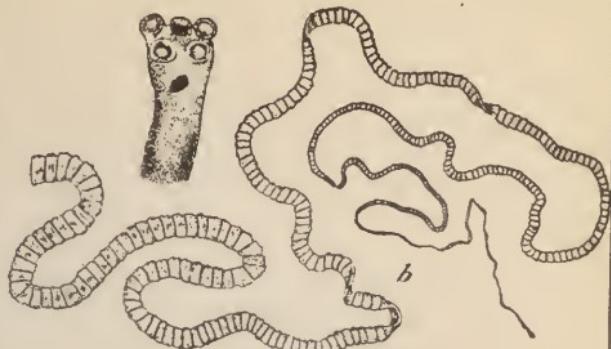
Every animal used for food has in its intestines either protozoa, round worms, flukes, or tapeworms. Some of these parasites, especially certain protozoa, are mere scavengers in the intestinal tract, but many of the infections undoubtedly do more or less harm to their hosts. Accordingly, academically these animals are diseased. . . .

If all animals harboring animal parasites are to be construed as diseased in the sense of the food laws, as they are undoubtedly diseased from the abstract academic point of view, it is clear from the zoologic point of view that no meat can be sold legally.

The professor's view is that although an animal may be diseased it should not be condemned as unfit for food unless it is diseased



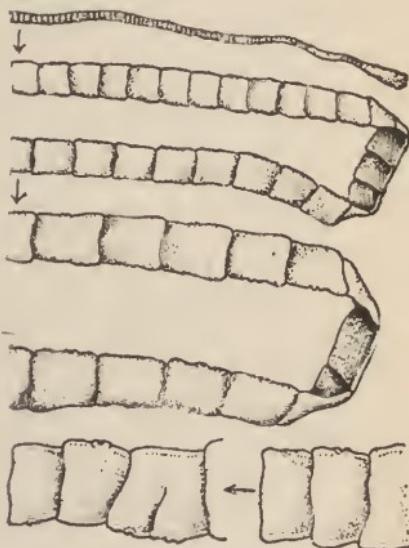
A PIECE OF MEAT INFECTED WITH PORK-MEASLES.



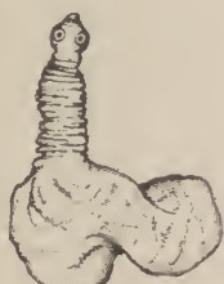
PORK TAPEWORM, HEAD HIGHLY MAGNIFIED.



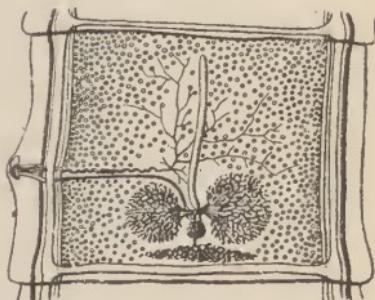
HEAD OF BEEF-MEASLE TAPEWORM.



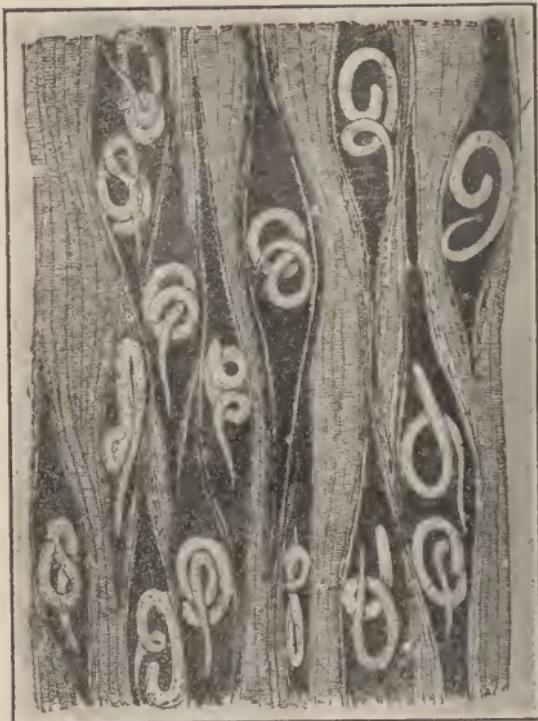
SEVERAL PORTIONS OF AN ADULT BEEF-MEASLE TAPEWORM.



PORK-MEASLE BLADDER WORM.



MATURE SEGMENT OF BEEF-MEASLES TAPEWORM.



THE PORK PARASITE

(*Trichina Spiralis*)

This worm-like parasite invades all parts of the body, finally resting in the muscles where countless millions may remain alive for years, a constant source of rheumatic pains.

in such a way as to be immediately dangerous to the eater. In illustration he adds: "When a meat dealer sells pork he is selling a product which in its raw state is dangerous to health for the reason that it frequently contains disease germs, *trichinae*, the absence of which cannot be guaranteed by any practical and proper method of meat inspection known. If the pork is properly cooked or otherwise prepared, these germs are killed, are rendered harmless and do not *per se* render the pork diseased (as food), for if dead they cannot produce disease."

The record of the Bureau of Animal Industry shows that in the year 1908 the meat and meat-food products condemned as unfit for food amounted to nearly three-fourths of one per cent of the total amount examined. From the established facts, it appears that practically all animals slaughtered are more or less diseased, and that nearly one per cent are so badly diseased as to be deemed by the inspectors wholly unfit for food. Is it to be doubted that a large part of those passed are likewise unsuited to serve as food for human beings?

A telegram from Washington, appearing in the daily papers, announced a warning by the United States Department of Agriculture against the eating of pork without special precautions. According to this official warning, *one or two per cent of all the hogs are infected with parasites, trichinæ or tape-worm.* These parasites are killed by thorough cooking, which the government officials insist must always be done, no matter if the pork has been examined by official inspectors and pronounced free from taint. Of course, cooked tapeworms and trichinæ cannot take possession of the body and fill one's muscles with wriggling parasites, but who can contemplate with complacency a diet of worms? A worm-eaten hog is not fit for food even for a cannibal or a scavenger.

The practice of flesh-eating is fraught with perils of many sorts. No one would for a moment think of eating a piece of meat found swarming with maggots, and yet a maggot is less harmful than trichinæ, and a cooked maggot is in all respects as wholesome as tape-worms or trichinæ.

The dog is a meat-eater, and in consequence harbors thirteen different species of tapeworms. In Iceland more than one-third of all the dogs are the hosts of tapeworms. One of the worst of these is the *bothriocephalus latus*, which grows to the length of twenty-five feet and is an inch broad. Men and dogs become infected with this horrible parasite by eating fish, several species of which, especially the pike, turbot, and perch, contain the embryos. Dogs are more subject to the parasite than any other domestic animal because of their flesh-eating habits.

The Peregrinations of a Deadly Parasite

Recent investigations carried on at the Pasteur Institute have developed some new and important facts in relation to the trichina, and the damage which it does the body. M. Romanovitch, who conducted the investigation, showed that the female parasites work their way into the lymphatics of the small intestine. There the young are born and are rapidly swept onward by the lymph current into the great blood vessels, by means of which they are distributed to the entire body. The

destination of the trichina worm is the muscle. The soft red pulp of the muscle fiber is the only substance on which the worm can live.

The first damage inflicted upon the body by the trichinae is the destruction of the epithelial covering of the small intestine, by which it is exposed to the action of bacteria. The resulting microbic infection gives rise to enlargement of the liver, abscesses, sometimes death, from the invasion of the body by pernicious bacteria. The trichinae also may carry bacteria with them wherever they go in their migrations through the body.

The experiments of Romanovitch, as well as the investigations of Metchnikoff, Durante and Linstow, show that the trichinae after they reach the muscles excrete highly poisonous substances which cause degeneracy of the muscle fibers adjacent to those containing the worms and which give rise to fatty degeneration of the liver, paralysis, convulsions, and diseases of the heart and kidneys. These poisons begin to appear about the end of one week after infection. There is no possible means of treatment by which the ravages of this parasite can be checked after the body has

once been invaded. The wonderful "606" of Ehrlich produces no beneficial effect. There is no doubt about the correctness of the statement by Osler, one of the world's most eminent medical men, that many persons who are supposed to suffer and die from typhoid fever are really victims of infection with trichinæ.

That infection of pork with the trichina parasite is very general and that no attempt is made to exclude infected animals from the meat supply appear from the following paragraphs from the report of the United States Public Health Service (June 27, 1919) :

That a dealer is not liable for selling meat infected with trichinæ and which caused illness, when there was no negligence in such sale, is the decision in a Pennsylvania case.

In an action to recover damages for illness resulting from eating pork infected with trichinæ, the defendant offered evidence showing "that parasites, known as trichinæ, are invisible to the naked eye and can be discovered only by microscopic inspection; that such inspection is untrustworthy and does not in all cases give assurance that the particular meat inspected and approved is free from parasites; that no system of inspection is known to science by which the presence of trichinæ can be detected with certainty in all cases; and that the only sure method of eliminating the danger is to thoroughly cook the meat at a temperature of at least 140°, whereby the harmful parasites are destroyed and the meat rendered wholesome and fit for food." Defendant also showed that "for reasons above stated, the United States gov-

ernment concluded an attempt to inspect all pork for trichinæ would result in more danger to the public than no inspection, for the reason [that] knowledge on the part of the public that an inspection had been made would lead to a false sense of security and induce consumers to omit taking proper precautions to avoid danger by thorough cooking."

It was shown, too, that many packing establishments made no inspection for trichinæ.

The court held that there had been no negligence on the part of the dealer and that people who eat pork must do so at their own risk.

From the above it is evident that the infection of hogs with trichinae has become so general that the federal authorities have abandoned the attempt to exclude diseased animals from the market and have left the public to look out for themselves. Unfortunately, the average citizen is unaware of the danger to which he exposes himself in the eating of raw pork and so cannot be expected to take the precautions necessary for his protection. In the writer's opinion, the condition is such as to justify the condemnation of the whole pork industry. The hog is too sick to be fit for human food, to say nothing about the filthy scavenger habits which led the Hebrew lawgiver, Moses, to prohibit his use as

food. The government warning is a frank avowal of the inefficiency of inspection, a fact to which the writer has often called attention. The best method of dealing with the pork question is to permit the pig to pursue his natural calling, that of a scavenger, a really useful vocation.

Typhoid Germs in Meat Products

The *Experiment Station Record* (April, 1912), published by the United States Department of Agriculture, gives an account of examinations of various meat products by E. Glaser, in which the paratyphoid bacillus was found in meat and sausage, particularly in smoked meats. The experiments of this investigator show that colon bacteria, especially the typhoid and proteus bacilli, when taken in food, may produce enteritis or inflammation of the intestine, which will permit invasion of the body by the micro-organisms and general infection. In a similar investigation conducted by E. Zweifel, in the examination of meat there were found twenty-three strains of organisms which "simulated

the paratyphoid bacillus and six others which resembled the typhoid bacillus."

In view of the above facts, considered in connection with the almost total lack of inspection as regards the bacteria present in meats, it is no wonder that both acute and chronic disease are so prevalent in all meat-eating countries. Almost daily new facts are appearing, as the result of the labors of expert bacteriologists, which show more and more clearly the importance of meat bacteria as a source of infection in both acute and chronic disease.

Water containing a few hundred bacteria to the cubic centimeter (16 drops) is considered unfit for use. When colon germs are present, such water is properly regarded as extremely dangerous. The use of water known to contain typhoid fever germs would be regarded as criminal, and proof of neglect leading to illness would furnish just ground for a claim for damages. Yet butcher's meat contains not simply hundreds of colon bacilli and far more dangerous organisms, but millions and even tens of millions; and, as shown above, even typhoid germs may be present

and in quantities enormously greater than ever found in public water supplies. There is no doubt that colitis and many other intestinal infections are directly due to the use of meat.

Flesh Poisoning

M. Babes, of Bucharest, writing in 1905, called attention to the fact that there is a whole series of maladies which may be justly charged to eating the flesh of animals and thereby introducing disease-producing germs, among which special mention is made of the *Bacillus enteritidis* and the various paratyphoid bacilli. Illness arising from these germs presents the ordinary clinical symptoms of typhoid fever. Professor Babes has observed two epidemics resembling typhoid fever from these meat bacteria, one originating in the eating of a lamb, and the other in the eating of certain fish.

No Protection for Meat-Eaters

The people of the United States have little or no protection against the use of diseased meats, notwithstanding the fact that disease prevails among our domestic animals to such

an extent that their mortality rate is three times that of human beings. The situation, except in some of our larger cities, is still such that any farmer can kill any old thing about his farm and carry it to town and dispose of it to the unwary public for food. This condition of things is intolerable in a civilized country.

According to W. P. Jones, formerly attorney for the United States Department of Agriculture, less than one-third of the cities of the United States having a population of 5,000 or more make any provision for the inspection of meats, yet this class of foodstuffs is more than any other likely to be rendered unfit for food by disease or deterioration. Within the year ending June 30, 1919, more than 70,000,000 animals were slaughtered in the United States under federal inspection. At least half as many more animals were slaughtered without inspection.

Says Mr. J. R. Mohler, chief of the Bureau of Animal Industry, United States Department of Agriculture, in the *American Journal of Public Health*, May, 1920:

The great need of an efficient meat inspection is shown by the number of animals and the quantities of meats and

products which are condemned yearly on account of disease, unsoundness, or other conditions of unfitness, and thereby excluded from the food supply. The complete figures for all classes of animals and the various reasons for condemnation involve considerable detail. However, a general statement regarding them should serve the purpose. For instance, on the postmortem inspection alone there was condemned in the fiscal year 1919 a total of 212,245 cattle, sheep, swine, and goats; while organs and parts of carcasses condemned on account of localized disease run into the hundreds of thousands.

Oyster Poisoning

Many cases of intense poisoning from the use of oysters have occurred, and a number of such cases have come under the writer's personal observation. In one case, a young man who had eaten oysters in the evening at a city restaurant came into the Battle Creek Sanitarium about midnight. He said he felt as though his intestines were "tied in knots"; he looked very pale and vomited and purged violently. He thought he was going to die, and for some hours he certainly had a good prospect of a funeral before him; but vigorous treatment saved his life. He attributed his sickness to the oysters. A few oysters from the same lot were obtained and some of the juice was injected beneath the skin of a strong, healthy cat. Within a few hours the animal

was dead, exhibiting the same symptoms as those which the young man had shown. An eminent Chicago surgeon several years ago lost his life from the same cause. After eating a few oysters he was seized with a terrible intestinal pain; obstruction resulted and death occurred, notwithstanding the fact that the abdomen was opened and every effort made to remove the obstruction.

Oysters thrive and grow fat in water charged with sewage. One cubic centimeter (16 drops) of oyster juice, when examined by a bacteriologist, was found to contain more than 1,500,000 bacteria. Shellfish often become infected in the fattening ponds or reserves, which are likely to be contaminated by drains and sewers.

In their work, *The Health Officer*, Overton and Denno tell us:

The most prolific oyster and clam grounds are located in shallow bays and estuaries where the water is likely to receive sewage from houses and villages. These waters nearly always contain colon bacilli, which are derived from the banks of rivers and creeks which flow into them. Oysters feed by extracting bacteria and other microscopic plants from the water which passes over their gills. The kinds of bacteria that are in the water will usually be found in the liquor which surrounds an oyster in the shell. Colon bacilli are nearly always found in this liquor.



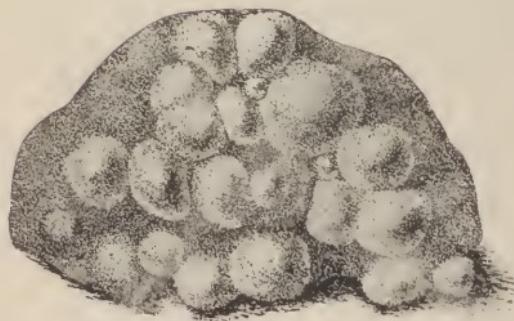
GERMS IN OYSTER JUICE

Magnified 1,200 Diameters. 270,000,000 to the ounce.



BLOOD FLUKE OF SHEEP

Male (smaller) and female.



HYDATIDS IN HOG'S LIVER

The oyster gathers in with other germs the typhoid bacillus, which thrives in oyster juice and will live in a salt solution five months. Giaxa observed that it is not affected by freezing, or by nine days in sea water, followed by twenty-five days in sterilized water.

M. Chantemesse, of France, by bacteriological examination showed the presence of both the cholera bacillus and the typhoid bacillus in the oyster and in oyster juice. Numerous instances may be cited where typhoid fever has developed from this source. Some years ago an epidemic of typhoid occurred among the students of Wesleyan University, Middletown, Connecticut, in which thirty cases developed, with one death. All were college students who had attended certain society suppers where raw oysters were served; among the students who attended other suppers, where the oysters were cooked, no typhoid developed. The oysterman lived near the river where he kept the oysters in tide-water shallows; typhoid fever was present in his family and his sewage drained into the oyster bed.

A multitude of such cases might be cited.

A few years ago persons attended a ball where oysters were served, and a large percentage of them developed typhoid fever. The oysters, obtained from a Glasgow merchant, were grown in a bay in Holland where the water was polluted with sewage, and were found to be infected with typhoid bacilli.

Dr. Soper, health officer of the village of Lawrence, New York, presented in 1905 a report of an outbreak of typhoid fever in which thirty-one patients were ill. In twenty-five of these persons the disease was traced directly to the use of oysters, to contact with typhoid patients, or bathing in water near oyster beds.

Dr. Segers, of Buenos Ayres, a surgeon in the navy of the Argentine Republic, according to the *British Medical Journal*, recently described a newly observed disease, which he calls "chronic mussel poisoning." In a recent visit to Tierra del Fuego, he made a careful study of this disease. The following are the principal symptoms: marked jaundice, hypertrophy followed by atrophy of the liver, and hemorrhages from the various mucous surfaces. The last-named symptom is speed-

ily followed by death. The disease prevails among the Fuegians to such an extent as to threaten the extinction of the race. Mussels are very abundant on the Fuegian coast and the natives depend on them largely for sustenance. By feeding the mussels to fowls, Segers was able to produce symptoms similar to those observed in human beings. The disease in human beings may be successfully treated in the first stage; but in the second stage, when atrophy of the liver has begun, the disease proves rapidly fatal in spite of all treatment.

The accumulation of evidence against the oyster as an article of diet seems to be rapidly increasing, and it appears safe to predict that the time is not so very far distant when this delicacy will be discarded as being too risky a morsel for human consumption. According to a recent writer, bacteriological examination has shown that "an average oyster, served in 'first class restaurants,' contains a minimum of 44,000 and a maximum of 880,000 germs. Think of it! you reckless creatures who step up to the oyster bar and take your half-dozen on the half-shell. If lucky, you have only

swallowed 264,000 germs; or it may be you have within you as a result of your light lunch, 5,280,000 germs."

It is generally supposed that the oyster is a particularly nutritious article of food. On the contrary, analysis shows that the nutritive value of a quart of oysters, solid meat, is only equal to that of two-thirds of a pound of bread, or two pints of skimmed milk, forgetting about the unwholesomeness of these germ-infected creatures.

The oyster dwells in the slime and ooze of the ocean bottom. His business is to wipe off with his fringelike "beard" the germs and infusoria from the slime-covered stones and shells of dead mollusks and the stems of sea-weeds which cover the sea bottom; to assist other scavengers in eating the sewage poured into the sea from the mouths of rivers; and to consume the excreta and the disintegrating bodies of millions of fish and other creatures which have died in the waters of the sea. It naturally becomes itself contaminated through its unwholesome surroundings, as do other scavengers.

When it is remembered that the nutritive

value of the oyster is barely equal to that of skimmed milk, it will be clearly evident that considering the great risks which are run in the use of the bivalve, "the game is not worth the powder." From an æsthetic standpoint, the practice of eating oysters on the half shell, "alive and kicking," is most revolting.

At one of the late Mr. Horace Fletcher's delightful conferences on "dietetic righteousness," an auditor asked about the fletcherizing of oysters on the half shell. Mr. Fletcher did not concede that mastication could be dispensed with, even in the eating of a live bivalve. "The oyster must be well chewed, unless it is to be eschewed," said Mr. Fletcher.

Who could wish it to be otherwise? To bolt a live oyster might seem just the proper thing to do, so as to get the slimy creature out of sight as soon as possible; but such precipitate absorption of the gentle beast affords no proper opportunity for appreciating his characteristic beauties (we use the masculine pronoun advisedly, for, although the oyster is a hermaphrodite as regards sexual character, it is proper to regard the male element as dominant).

It is certainly necessary to chew an oyster well to really appreciate what a very useful and patient little brute he is. In no other way is it possible to become intimately acquainted with his very interesting anatomy. For instance, look at his mouth with its broad fringe of filmy lips, which he wraps so deftly around the slime-covered seaweeds which it is a part of his business to lick clean of the diatoms, typhoid bacilli, and various other germs and animalculæ which make up the ooze of the ocean bottom—the oyster's pasture ground.

What delightful reminiscences of oyster experience! The very thought of masticating such a mouth raises pictures of bacchanalian feasts of garbage residues and sewage! They fairly make one's mouth sea-water with expectation.

Lucky it is for fletcherizers of oysters on the half shell that this interesting biologic curio from the sea left its teeth behind somewhere on the road from monad to mollusk. To fletcherize the mouth of a dog, or of a cat—even the mouth of a turkey or hen—would be a hard task indeed. But an oyster's

mouth is easy—slick, flimsy, edentulous—that is, well lubricated with oyster saliva, toothless and tender—one may swallow a mouth like that with ease and comfort.

Of course, it seems incongruous from a biologic standpoint that one mouth should masticate another; but such uncanny thoughts are obliterated by the joy of the conquest which possesses the eater of an oyster on the half shell when he wrenches the wretched scavenger from his shell house, quite regardless of the consequences to his tender viscera, and incorporates him into his own anatomy.

And then as the fletcherizing process proceeds and one works further into the subject, what a delight to find the oyster's stomach a real live one, with gastric glands, cardia, pylorus, and other digestive machinery all at work. One need not worry because he finds in the oyster's gastric pouch so fine a collection of typhoid bacilli, colon germs, streptococci, and other sea-faring plants and beasts, for does not everybody know that an oyster's stomach, accustomed to filth gathered from the ocean floor, is a veritable Hercules?—that notwithstanding the violence which it receives

it is always ready to return good for evil, and pulling off its coat and rolling up its sleeves, so to speak, help the oyster-eater in the digestion of the bivalve's miscellaneous meal as well as the rest of the eater's bill of fare. (Unfortunately this belief in the oyster's digestive benevolence is a cruel myth.)

And what a delightful tickle is imparted to the tongue in rolling the oyster's alimentary canal, big and little intestines, from tooth to tooth, and all along the line from front door to back door of its digestive tube!

And the interesting things that one meets along the road!—that big bunch of sympathetic nerves just behind the oyster's stomach, all live and squirming, shooting out little explosions of nervous energy each time the crunching molars pinch them! What felicity to feel the tingle of this roisterous (raw-oyster-ous) nervous energy working its way into one's exhausted spinal centers, rising into one's cerebrum, lifting one's spirits and dissipating "brain fag!" What a blessing that such an easy way has been found for re-enforcing brains when stock is low!

But we are hardly fairly started on our

oyster chew! There are broad fields of anatomic interest yet to explore, particularly that big brown end which has glycogen and other things in it, especially bile, urea, uric acid, ptomaines, etc. This is the oyster's liver and kidneys all in one, a most interesting anatomical curio, a biologic laboratory in which most extraordinary things are done. As one's teeth begin to enter this complex excretory gland (made extra big so as to enable the oyster's constitution to stand the strain of its disgusting bill-of-fare), the fletcherizer should realize that he is prying into one of nature's secret places; that his incisors are penetrating into most profound mysteries.

How exhilarating and appetizing are such reflections! How much the average oyster-eater misses when he swallows the creature whole—mouth, stomach, ileum, jejunum, colon, solar plexus, liver, kidneys, and all—with-out ever stopping to count its pulse or to note the gentle tap of its heart-beat against his hard palate or the queer wriggle of its midgut, or the delectable flavor of its liver-kidney juices!

There is nothing like fletcherizing to make one thoroughly acquainted with the true in-

wardness of an oyster. If among our readers there are any who still hanker for the sea scavenger, just try the experiment of eating a live oyster right, masticating à la Fletcher, and report to us the result.

Converting Sewage into Food

It is announced that the New York State Conservation Commission has discovered a method by which sewage may be converted into food. A few years ago the health officials of an enterprising western city invented the garbage farm, a place where garbage is fed to hogs. After the hogs become fat they are killed and carried back to town and fed to the people who supplied the garbage. Thus it has been reported the garbage plant not only pays its way, but makes a handsome profit for the city, and so our experts in municipal financeering are rejoicing, having discovered a scheme by which the citizens can be made to eat their own garbage and pay for the privilege.

According to the following article, which appeared in the *New York Times* for Sunday, December 17 (1922), the New York

State Conservation Commission has discovered a method by which the people of New York and other large cities can be made to eat their own sewage and pay for the privilege. It has long been noted that the fattest oysters are found about the mouths of sewers. It was reported not long ago that one oyster man had greatly increased the size of his oysters by dumping into the bed several loads of manure.

The oyster is a scavenger. To consume the filth found in the waters of the ocean and so help to keep the ocean water from becoming putrid, is the special function of the oyster, clam, lobster, crab, and other allied species of animals. Those of our readers who are fond of oysters will be especially edified by reading the following account of the new plan for fattening oysters on sewage:

"Very much after the fashion in which the housewife washes a few potatoes in a kitchen pail, oysters from slightly polluted beds are being cleansed wholesale and saved as edible food. Announcement of perfection of a process that has changed vast quantities of bivalves from the condemned to the safe class

has just been made by the State Conservation Commission.

"Such success as has attended the experiments results from several years' work in which progress has been in an effort to purify shellfish so as to make usable large productive areas which are suitable breeding grounds except for the presence of some pollution. Commissioner Alexander Macdonald now announces that the first commercial oyster purification plant in this country has been built by Sprague & Doughty, at Inwood, L. I., and has been certified by the commission and approved by national and local health authorities.

"Essentially the process is one of cleansing healthy oysters to rid them of deleterious foreign matter. In attempting to separate pure oyster beds from those which were polluted, it was found that a considerable area was but slightly polluted, or polluted only at times, and that the beds involved were those from which the fattest and whitest oysters came.

"Though oysters carry germs of typhoid fever, they do not themselves have that disease. Oysters feed by causing the current of

water to pass through their shells, straining out solid matters. If the water contains typhoid germs, the oysters will take them out and keep them for a time. If the supply of bacteria is cut off, the oyster will soon lose those which it has, and, as no more can reach it, will soon become free from those particular germs. Thus, if an oyster is removed from a polluted to an unpolluted bed, it soon will purify itself."

"By the use of this method it is expected that valuable oyster grounds near New York, now so polluted with sewage that oysters from them cannot safely be used, will again become of value, and the supply of oysters will thus be increased."

Sewage fattened bivalves will soon be appearing on the tables of oyster lovers along with the garbage-fed pork. What dietetic indecency will next confront us?

EXPERIMENTAL EVIDENCE AGAINST FLESH-EATING

The most convincing evidence of the superiority or safety of any practice in relation to human health is afforded by the actual experience of those who have followed the regimen long enough to appreciate its advantages. For this reason, the author feels justified in offering his own experience in evidence of the value of a biologic diet, after a trial of its virtues for more than fifty-six years (1866-1922).

When a boy of fourteen, the reading of a work by Dr. Sylvester Graham, an ancestor of Dr. Graham Lusk, of New York, convinced the writer that man was intended to subsist upon a diet consisting of the products of the earth with the addition of milk and possibly of eggs. Particularly strong in its impression was a quotation from Cuvier, the great French naturalist, to the effect that the natural diet of man was the same as that of the chimpanzee and the other large apes. Meats of all sorts were at once discarded, and, although a puny boy, threatened with an early death from tu-

berculosis and with a very poor chance of living to the age of twenty, the writer finds himself now, in his seventy-first year, after half a century of hard professional work, still able to stand at the operating table several hours in succession, to spend many hours daily in the consulting office, lecture several times a week, and dictate or write almost every moment when not otherwise occupied with necessary duties, rarely closing the day's labors until midnight and very often an hour or two later.

For fifty years the writer has been preaching the doctrine of biologic living with voice and pen, and has persuaded some thousands of people to adopt the principles of the simple or natural life. In all this time not a single instance has been brought to the writer's notice in which a person has been injured by an intelligent adoption of the principles and methods which have been advocated.

During all these years, the experience of the Battle Creek Sanitarium has been an active object lesson in the advantages of a low protein, fleshless, dietary. Out of more than 250,000 persons who have visited the institu-

tion and tested the merits of the fleshless dietary set before them, no one has been harmed, but thousands have been delivered from maladies and miseries and have found rejuvenation, increased efficiency, and deliverance from disease.

And this experience has been by no means anomalous. The countless millions of China are for the most part flesh-abstainers. In fact, at least two-thirds of the inhabitants of the world make so little use of flesh that it can hardly be considered an essential part of their dietary.

McCollum's Experiments

McCollum in his experiments upon rats has reached the conclusion that if flesh-eating nations are in any respect superior to non-flesh-eating nations the superiority is not due to the fact that they are eaters of flesh, but to the large use of milk which practically always accompanies the use of meat. Milk is rich in vitamins, which are lacking in meat.

All physiologists are now agreed that a properly selected dietary from which meat is excluded is wholly competent to sustain hu-

man health and vigor under all conditions of life. It is chiefly important that a sufficient amount of complete proteins and the essential vitamins should be secured. Complete proteins are found in the almond and also in the soy bean and the peanut, a fact which accounts for the large use of the soy bean and the peanut in China and other Oriental countries as a supplement to a diet of rice and green vegetables. A sufficient supply of complete proteins may always be assured by making use of a pint or even half a pint of milk daily, in addition to a varied bill of fare of fruits, grains, and fresh vegetables.

That authority is not lacking in support of the biologic bill of fare, will be seen from the following quotations:

Dr. S. Weir Mitchell Endorses the Meatless Regimen

The late Dr. S. Weir Mitchell of Philadelphia, one of the most distinguished physicians of his time, has often been quoted as an advocate of the necessity for meat as a fat- and blood-building food. It appears, however, that this use of his authority is not warranted,

since in one of his works, in referring to the justification of the killing of animals for food, he remarks: "The argument as to need for animal flesh is hardly a help. Men, in fact nations, live without it; and it is quite possible that we have in time more or less manufactured both the appetite and the need for this diet. Our nearest anatomical kinsmen, the monkeys, are all vegetarians."

Bunge twenty years ago called attention to the fact that "the normal food of the adult should be furnished by the protein and carbohydrates in the proportion met with in the cereals: (corn 10 per cent; rice, 9; wheat, 12; average, 10.3). He also noted that Bavarian laborers, who do the hardest sort of work, live on a diet of flour and fat; and he refers to the investigations of Panum and Buntzen, from which it appears that "even a carnivorous animal can be nourished on cereals and fat." These investigators kept a dog in good health for months on an exclusive diet of oatmeal and butter, and without loss of weight. There are instances on record in which dogs and also cats have refused to eat meat and have lived all their lives on a fleshless diet. The writer

has known of several dogs that refused to eat raw meat.

Dr. Alonzo Taylor, professor of physiological chemistry in the University of Pennsylvania, in his work entitled *The Chemistry of Digestion and Metabolism*, says: "A proper vegetarian diet is in every way a normal and competent diet. Plant proteins contain the same amino-acids as animal protein and all are there present in abundance. It is quite immaterial to the body whether it forms its stock proteins from amino-acids derived from plant protein or from animal protein."

An Eminent Scientist on Meat Diet

With reference to the necessity of meats as an element of man's diet, Gautier says:

It would be wrong, however, to suppose that privation of muscular tissue (lean meat) prejudices his physical energy.

According to J. Sinclair, the Hindoo *pattamars*, carriers of dispatches, who only eat rice, run every day, passing from one town to another, twenty leagues at least, and continue thus for weeks. Russian agriculturists who live on vegetables, black bread, milk and garlic, work sixteen to eighteen hours per day, and their strength is said often to exceed that of American sailors (Bremner and Howland). The Norwegian peasants scarcely know of animal alimentation; they cover, however, whilst accompanying the carriages of tourists, from three to four leagues, running without stopping.

Modern Egyptian workmen and boatmen, who from time immemorial have fed almost exclusively on melons, onions, broad beans, lentils, dates and maize, have remarkable muscular strength (Land and Catherwood). The miners of South America, very sober workmen, who do not eat meat, carry on their shoulders weights of 200 pounds, with which they mount twelve times a day, on an average, vertical ladders 60 to 80 meters high (F. Head, L. Playfair and Darwin). According to H. Ranke, the woodcutters of upper Bavaria feed almost exclusively on flour (1,100 to 1,200 grams per day) cooked with lard (90 grams) without eggs or cheese; on Sundays only they have a little pork. They do, however, an enormous amount of work. The Turkish soldier is extraordinarily abstemious; he only drinks water or lemonade; he feeds on pilaff of rice and figs and scarcely touches meat. We know that his vigor is remarkable and his courage indomitable. The street porters of Salonica and Constantinople, who are fed in the same way, are of a proverbial strength. Hence the saying: "As strong as a Turk."

I add that I have known very intelligent people, men and women, who, having become vegetarians from principle or for hygienic reasons after having formerly eaten flesh like everyone else, have told me that they have done admirably with absolute abstinence from the point of view of their strength and of their health.

Spense, in Von Noorden's authoritative work on metabolism, says, "The old question whether omnivorous man, like the herbivora, could with impunity draw his entire supply of protein from the vegetable kingdom alone, is in principle one which is already decided for us through the practice of those people

who live exclusively on vegetable foods. Physiological investigation can therefore only supply the evidence that it is indeed true that the vegetable-albuminous substances as they occur in nature are equal in nutritive value to an equivalent quantity of protein of animal origin."

Fauvel's Observations

M. Fauvel began in 1902 a series of experiments on the effects of a non-flesh dietary which extended for a period of more than two and one-half years. The results of this extended research, which were presented in a paper read before the French Association for the Advancement of Science at its meeting held at Grenoble, August, 1904, are exceedingly interesting. The essential facts reported may be summed up as follows:

Flesh was wholly excluded from the dietary. Milk, butter, and eggs were used in addition to vegetable products, but eggs very sparingly, two eggs being taken at one meal two or three times a week. Three meals were taken daily: in the morning a little bread with milk or chocolate; at 11:30 a. m., radishes, cucumbers, artichokes, or some other vege-

table, with fresh fruit, two dishes of legumes or grains, one or two eggs two or three times a week; dinner was at 7 p. m., and consisted of some green vegetable with a small amount of cereal food, salad, and fruits.

The ordinary weight, which had been observed for several years before, was maintained. The average composition of the urine was found to be as follows: specific gravity, 1.02; urea, 17.63; uric acid, 0.14; acidity, 0.95; total nitrogen, 8.23. A very marked decrease in the quantity of uric acid was noted, the proportion of uric acid to urea being one to 126 instead of one to 140, the usual proportion. The average amount of protein taken daily was 60 to 66 grams, which was found to be quite sufficient even during hard work. The body temperature was found to be on the average nine-tenths of a degree (F.) less in the subject experimented upon than that of the average individual; but it was not determined whether this might not be due to some personal idiosyncrasy, as the temperature was not taken before the beginning of the experiment. Exercise produced a rise of temperature amounting to one-half to two-thirds

of a degree instead of two or three degrees as was observed by Davy, Mosso, and others whose subjects were flesh-eaters. It was also observed that exercise, even when violent and prolonged, produced neither stiffness nor fever. Special attention was called by the reporter to the fact that the good results of a non-flesh dietary are commonly noticeable when pains are taken to eat slowly and to masticate the food thoroughly and to carefully avoid taking an excess of food, an error which is frequently committed under the belief that vegetable food is less nourishing than animal food and hence must be taken in large quantities.

Greater Endurance of Flesh-Abstainers

The *Journal of the American Medical Association* published some years ago an abstract of a report made by Baelz, of Tokio, Japan, to the Berlin Medical Society upon the relation of flesh-eating to endurance as observed among the Japanese. He stated that he had found the vegetarian Japanese actually more enduring than meat-eating foreigners in control tests, and recent events in China have

corroborated his experiences. In the interior of Japan it is impossible for the masses to procure even fish or much rice, and as the Japanese cows do not give much milk they have no butter or cheese; the food is limited to barley or buckwheat with one-quarter rice, the soy bean, and no meat. The soy bean contains more protein than does beef, and 20 per cent of oil. Among tests of endurance he mentions that he once drove 110 kilometers (68 miles) in fourteen hours, changing horses six times. A Japanese pushing a cart made the trip at the same time in fourteen and one-half hours. He had two rickisha men trot 40 kilometers (25 miles) with his weight of 80 kilograms (175 pounds) every day in the heat of the sun. At the end of fourteen days one of the men had gained 5 kilograms (11 pounds) in weight. He then added a little meat to their food, but the men said it made them feel tired, so it was suspended after three days. At the end of the twenty-second day of the test, the men were as full of energy as at first.

Dr. J. Ioetyko, director of the laboratory of the University of Brussels, made recently (1907) an exhaustive study of the relation of

diet, especially of a high protein diet, to endurance. Comparisons were made between persons for years accustomed to a vegetarian or low protein dietary and those who used the ordinary mixed diet. In the first class there were forty-three subjects, concerning whom it was remarked that they appeared younger than their age and were particularly distinguished by their clear, fresh complexions. In strength they showed no superiority over the subjects accustomed to a high protein dietary, but in endurance they exceeded the high protein feeders 50 to 200 per cent. It was noted that the low protein feeders were able to endure work on the ergograph two or three times as long as the meat-eaters.

Dr. Ioteyko also observed that the non-flesh-eaters recuperated from fatigue far more quickly than did the meat-eaters. With the aid of a student, V. Kipiani, a series of coefficients was worked out, by means of which the influence of various factors contributing to these results might be estimated. By this method it was shown that the performance of the flesh-eaters was twenty times as much influenced by toxins as was that of the flesh ab-

stainers. The excitability of the central nervous system was four times as great in the meat-eaters as in the flesh-abstainers, while the utilization of carbohydrates by the flesh-eaters was only 75 per cent that of the flesh-abstainers.

The Death Rate Reduced by a Meatless Diet

During the late war there were numerous experiences in human feeding which, when properly analyzed, are the equivalent of scientific experiments on an immense scale, and the interpretation of which leads to some highly important conclusions. For example, in Germany, where almost no meat was consumed and the dietary was necessarily of meager proportions, the amount of protein consumed being reduced to a minimum through the great scarcity of milk and eggs as well as meat, the death rate of the policy-holders of one of the largest insurance companies was shown to be reduced much below the pre-war level, and was notably less than that of the policy-holders of the same class in the same company in this country.

Another notable example was that of the Danish people, of whom Hindhede says that the death rate between October, 1917, and October, 1918, the most trying period of the war, was 10.4 per 1,000 as against the lowest previous death rate, which was 12.5 for the years 1913 and 1914. Hindhede attributes this low death rate to the low protein dietary, practically vegetarian, necessitated by the Danish food regulations, and especially to the large amount of bran consumed during this period. The Danes sold nearly all their live stock to Germany at a high price and thereby secured the double advantage of better health and financial gain. The regulation bread consisted of entire rye meal to which was added wheat bran and 24 per cent of barley meal milled to 95 per cent. Hindhede testifies that this mixture (much coarser than pumpernickel) made excellent bread "which produced no digestive troubles," and adds that "as bran can replace meat and eggs, man should eat whole wheat bread and not so much of the more costly foods."

Flesh-Eating Does Not Develop Intelligence

It has been argued by certain apologists for flesh-eating that human intelligence was developed by hunting and learning to combat other animals successfully. But that this is not true is shown by the fact that the apes are the most intelligent of all animals next to man, and none of them are meat-eaters.

Says the learned editor of *Living Animals of the World*:

The question of the comparative intelligence of the apes and monkeys, and the carnivorous animals subsequently described in these pages, is an interesting one. It would seem at first as if the cat tribe and their relations, which have to obtain their prey by constant hunting, and often to make use of considerable reflection and thought to bring their enterprises against other animals to a successful issue, would be more likely to develop intelligence and to improve in brain-power than the great apes, which find an easy living in the tropical forests and only seek fruits and vegetables for their food. Yet it is quite certain that this is not the case. The cat tribe, with the exception of the domesticated cat, does not show high intelligence.

That meat-eating has a decided effect on character was pointed out long ago by Liebig, who noted the fact that the keepers in charge of a certain bear pit in a neighboring town

frequently amused themselves by changing the character of their bears through feeding them meat, which in a few days transformed the most docile and humble performing animals, ready to amuse the spectators with their curious tricks, into surly, quarrelsome, snarling brutes.

That a non-flesh diet does not necessarily produce timidity of character and lack of force and aggressiveness is shown by the fact that of all animals the wild bull and the rhinoceros, though not predatory and strictly herbivorous, are most ready to resent an invasion of their forest habitat and to attack the invader. Even the lion, unless pressed by hunger, slinks quietly away while the bull or the rhinoceros boldly charges upon its foe. The gorilla, though not a flesh-eater, is one of the fiercest fighters of the forest.

It is interesting in this connection to recall the fact that "the tiger," Clemenceau, the war premier of France, and Joffre, are reported to be flesh-abstainers.

An eminent English writer well says in answer to the assertion that a non-flesh diet tends to destroy courage and robust vigor:

"This is scarcely likely from a comparison of the animals. The buffalo, the rhinoceros, and the Chinese pirate, all vegetarians, are equally remarkable for their cunning and ferocity."

That meat-eating does not have an elevating influence upon men or races is shown by the degraded condition of all extremely carnivorous races. The natives of Tierra del Fuego, the Kalmuck Tartars, and many other carnivorous tribes might be mentioned as examples. The Jessup Exploring Expedition, which some years ago explored the North Pacific, reported the discovery of a people who are almost altogether carnivorous in their habits of diet. A hideous custom prevailing among them is that of taking the lives of those who become old and infirm. This custom exists among other flesh-eating people, but has never been reported as prevalent among any tribe or nation of people who are abstainers from flesh foods. An Asiatic tribe of flesh-eaters among whom this practice was found went farther, taking the lives of relatives who happened to fall sick from disease as soon as the illness was found to be serious. This people added the still more hideous custom of eating

their friends and relatives after taking their lives.

Meat-Eating and Race Degeneracy

The notable decrease in life expectancy after forty years, and especially between the ages of fifty and seventy years, as shown by the statistical researches of the Massachusetts life insurance department, and by official statistics of England, Scotland, Wales, and Italy, as well as those of this country, together with the notable increase in chronic disorders of all sorts in every civilized country and the marked evidences of physical deterioration noted wherever a careful investigation of the matter has been made, are cogent facts which indicate that there are existing in connection with modern civilization causes which are undermining the stamina of the race.

Dr. Watson, an eminent English physiologist, suggests that one of the causes which is responsible for the marked physical deterioration that has taken place within the last fifty years is probably the increased consumption of flesh foods. He says that the amount of meat imported into Great Britain had in-

creased in fifty years from 3 pounds per capita to 50 pounds per capita annually. With this increased consumption of meat has come a marked increase in mortality from cancer, Bright's disease, and nearly every other chronic malady.

There is probably no country in the world in which physical deterioration has been going on so fast within the last century as in France. Upon the question of meat-eating Gautier says: "Before the Revolution the French peasants ate almost no meat at all." According to Taine, who based his statement upon a careful study of the commissary reports, the basis of the peasant's diet in the greater part of the country was oats; "in the district of Troyes, buckwheat; in Marche and Linousin, buckwheat with chestnuts and beetroots; in Auvergne, buckwheat, chestnuts, curdled milk, and a little salted goat; in Beauce, a mixture of barley and rye; in Berry, a mixture of barley and oats." None at all of wheat bread; none at all of flesh of the shambles; at most the French peasant "kills one pig a year." At the present time, according to Gautier, the per capita consumption of flesh

in France is 38 kilograms, or 83 pounds, per annum.

These facts are certainly significant and worthy of consideration, particularly in the light of the observations of Metchnikoff and Herter, who showed the relation between the enterotoxins resulting from intestinal putrefaction and the changes in the arteries and other tissues which constitute premature old age and which lay the foundation for many chronic degenerative maladies.

Meat-Eating a City Habit

The per capita consumption of meat in cities is much greater than in the country districts. This is true of all countries, particularly in continental Europe. In Paris, for example, the annual per capita consumption of meat in 1887 was 227 pounds. According to Gautier, the average consumption in France throughout the country is about 83 pounds, or less than two-fifths as much. In England the average consumption is 130 pounds. This is, perhaps, an explanation of the fact that race degeneration is more pronounced in the cities than in the country districts. The city dweller

in France, according to Gautier, consumes daily an average of nine ounces of meat, while many consume twice as much. Says Gautier:

Like the opium smoker, the person who is accustomed to meat feels that something is lacking when he does not indulge in his habitual excess. It is the illusion of the morphinomaniac, the tobacco user, the one addicted to the use of alcohol, etc.; a troublesome exaggeration of the man living in luxury who believes that he is meeting a real necessity when he is only gratifying an appetite which he has himself created, and who gratifies himself at the expense of making himself sick, and often imagines in so doing he is defending the interests of his health.

There are some tables from which vegetables are almost wholly banished. The reason assigned is that they are not nourishing enough or that they are not agreeable to palates accustomed to the more pronounced flavor of meats; sometimes because their preparation requires more care and time than the housekeeper can give; for example, in families where the housekeeper works outside. The attempt is made to compensate for the deficiency of vegetables by an excess of meat. This is a very dangerous error. The infants of parents fed on such a diet are nervous, cachetic, eczematous. Later they will become rheumatic, gouty, subject to calculi and migraine, neurotic. *I do not doubt that the degeneracy that is apparent in many wealthy families is the result of a diet too exclusively composed of flesh which they have gradually adopted.*

The closing words of this eminent authority are the deliberate summing up of the results of the widest research and most extensive observation. The late Professor Gautier

was one of the world's greatest authorities on the subject of dietetics and alimentation. His profound chemical knowledge and his position as supervisor of food supplies for the French army afforded him abundant opportunity for collecting the data necessary for a well-grounded judgment.

Non-Meat Diet Best Even for Carnivorous Animals

It is an interesting fact that many so-called carnivorous animals thrive best on a diet which includes little or no meat. The best hunting dogs are never fed meat. In recently published accounts of certain famous English kennels, in which are reared dogs that sell from \$500 to \$5,000, bills of fare are described in which meat plays a very small part and is always cooked. The meat is first boiled for several hours, and it is then dried and powdered or minced. The water in which the meat is boiled is thrown away. The statement is also made that none of these high-bred dogs will eat raw meat. The diet consists chiefly of coarse biscuits, milk, and cereals with vegetables.

The Scotchman's dog.—Sandy's dog is one of the essential members of his family. Without his dog, the Highland shepherd could not manage his flocks. The intelligence of these animals and their susceptibility to training are marvelous, scarcely matched by any other class of living creatures below man. Their wonderful endurance is also very remarkable, and their power to resist fatigue and cold is astonishing. Though more poorly protected from cold than the sheep which they guard, these dogs are able to face the fierce winds which in winter rage among the Scotch mountains.

With these facts in mind, it is interesting to know that this most intelligent and enduring member of the canine family is never allowed to eat the smallest bit of meat, but is fed exclusively upon vegetable food. When the writer asked a Scotch shepherd, "Why do you never feed meat to your dog?" he replied, "If I fed meat to my shepherd dogs, they would soon learn to help themselves to mutton, and could not be trusted to guard the sheep."

Once, when riding through the Highlands on top of a touring coach, sitting by special

permission upon the driver's box, we asked the very intelligent driver as to his occupation the rest of the year—for the tourist season is very short.

"Farmer an' hunter," he replied.

"And what is your diet?"

"Brose, bannocks, an' potatoes, sir."

"And what do you feed your hunting dogs?"

"Same as I eat mysel'."

"Do you never give your hunting dog meat, then?"

"Never," he said.

"And why not?"

"He has na' sae guid wind, if he eats meat," said the hunter.

MORAL: If the dog, a so-called flesh-eating animal, becomes more hardy, more cold resisting, more enduring—in other words, a better dog—on a diet from which flesh is entirely excluded, certainly frugivorous man, whose natural diet excludes flesh meats, ought not to be afraid to trust himself to a natural dietary from which the dead bodies of other creatures are excluded.

The Effects of a Meat Diet on Rats

E. B. Forbes tells us in the *Bulletin of the Ohio Agricultural Experiment Station* that "Chalmers Watson has found that in animals (rats) fed on an exclusive meat diet the bones present an appearance of delayed and imperfect ossification with increased vascularity, or blood content, and an increase in the number of red corpuscles. The symptoms are very similar to those in rickets in human-beings, but microscopic examination shows that the conditions are not identical."

The Effects of a Flesh Diet upon Rabbits

Garnier and Simon presented before the Société de Biologie of Paris (1907), a report of an investigation conducted for the purpose of determining the effects of a flesh diet upon rabbits. The observers were particularly struck with the changes which were shown in the liver. It was frequently noted that there was a great increase in the amount of bile, the large intestine being filled with dark green bile, and the gall-bladder greatly distended. Microscopic examination of the liver showed

intense congestion, hemorrhages, and areas of necrosis. These evidences of degeneration led the authors to the conclusion that rabbits subjected to a meat diet did not die of starvation but from "a veritable intoxication originating in the intestine." Thousands of human beings die annually from the same cause.

A flesh diet is scarcely more natural to man than to the rabbit. His bodily structure is adapted to deal with the products of the field, the garden, and the orchard, rather than those of the chase and the abattoir.

Effects of Meat on Cocks.—Pezard, a French investigator, has shown that an exclusive flesh diet causes in cocks degeneration and atrophy of the genital glands, with the usual effects of castration.

Flesh-Eating Animals Short-Lived

The average ages at death of some of the best known animals, according to Professor Lankester, of London, and the *British Encyclopedia*, are as follows:

ANIMAL	Food	AGE	YEARS
Rabbit	Vegetable	7-10	
Sheep	"	10	
Goat	"	10	

Ox	"	15
Horse	"	25-40
Deer	"	30
Donkey	"	30-40
Camel	"	50-100
Rhinoceros	"	70-80
Hippopotamus	"	70-80
Elephant	"	100
		Average 35-43
Fox	Flesh	10
Dog	"	15-20
		Average 12½-15

That flesh foods are not necessary for strength is shown by the prodigious strength of the ox, the hippopotamus, the elephant, the chimpanzee and the gorilla. The latter is said to possess the strength of ten men (Garnier). Tibbles, in discussing this question, makes the statement that man is the strongest of all animals, attributing this fact to his "mixed diet." This author certainly errs when he says that "no vegetarian animal can lift the weight of his own body." The horse, an animal which lives upon the coarsest products of the vegetable world, can not only lift the weight of his own body but with the added weight of a heavy man upon his back can make prodigious leaps over fences, ditches, and other obstacles.

Writers on dietetics have, indeed, made a very poor showing in their attempts to demonstrate the inadequacy of a non-flesh dietary. The wiser ones have in recent years wholly abandoned the attempt and now agree that meat is not essential as an article of food.

So far as the writer has been able to ascertain, there is not at the present time a single leading authority in physiology who would undertake to defend the use of flesh food as being an essential part of the human bill of fare either in health or disease.

THE ETHICAL ARGUMENT

In the discussion of this phase of the question we shall not undertake to bring forward any new evidence or argument. The ethical side of the subject seems to have been exhausted long before the Christian era by those ancient reformers, Buddha and Pythagoras, who, each in his own country, and in his own simple way, undertook to win men back to the original simple dietary of the first representatives of the race.

From a vegetarian point of view it is interesting to note that the historians of all ancient nations represent them as looking backward to a "golden age," when animals were not slain for food, when a universal fraternity prevailed among all living, sentient things.

The Biblical account of the dietary of the first man agrees exactly with the traditions of the early experience of the race which have been held in common by all the ancient peoples. It is an interesting fact that the description of the dietary assigned by the Creator to the human family, according to Genesis,

agrees precisely with the bill of fare that science assigns man by the consideration of his anatomical structure and his physiological needs.

The basis for the ethical argument against flesh eating is to be found in the fact that lower animals are, in common with man, sentient creatures. We have somehow become accustomed to think of our inferior brethren, the members of the lower orders of the animal kingdom, as things; we treat them as sticks or stones, as trees and other non-sentient things that are not possessed of organs of sense and feeling. We are wrong in this; they are not things, but *beings*. We forget the wonderful likeness that exists between us and these lower creatures. We neglect the fact that their brains are much like our brains, their muscles like our muscles, their bones like our bones, that they digest as we digest, that they have hearts that beat as ours beat, nerves that thrill as ours thrill, that they possess to a wonderful degree the same faculties, the same appetites, and are subject to the same impulses as we. An ox, a sheep, can hear, see, feel, smell, taste, and even think, if

not as well as man, at least to some degree after the same fashion. The lamb gamboling in the pasture enjoys life much in the same way as the little child chasing butterflies across the meadow. A horse or a cow can learn, remember, love, hate, mourn, rejoice, and suffer, as human beings do. Its sphere of life is much restricted, but life is not the less real and not the less precious to it; and the fact that the quadruped has little is not a good and sufficient reason why the biped, who has much, should deprive his brother of the little that he hath. For the most part it must be admitted that the lower animals have adhered more closely to the divine order than has man and hence are worthy to live.

The gorilla in the forest chooses his food in accordance with the natural instincts implanted in his nature by the Creator. It is interesting to know that his bill of fare is identical with that which, according to Holy Writ, was given to Adam in the Garden of Eden. The gorilla, the chimpanzee, the orang-utan, are, in fact, adhering more closely to the divine order in diet than is civilized man, with all his intelligence and knowledge.

Must we not confess that our readiness to take the lives of animals and to eat them for food is largely based upon the fact, as Plutarch suggested hundreds of years ago, that they do not possess the faculty of human speech? If a butcher about to cut the throat of a lamb should be suddenly addressed by the innocent creature with a pathetic appeal for its life, it would doubtless be necessary for him to take a few more steps downward in the degradation of his manhood before he would be able to bring himself to the accomplishment of his cruel purpose.

But although the sheep goes dumb to the slaughter, do not its eloquent eyes appeal for mercy? Do not the bleating of the calf, the bellowing of the bull, the cackling of the frightened geese, the gobbling of the reluctant turkeys, and the cries of hundreds of other creatures that we call dumb, but to each of whom nature has given its characteristic mode of speech, rise in eloquent protest against the savagery to which the instincts inherited from our cannibalistic ancestors habitually lead us? That we are able in cold blood to take the lives of these innocent beings, then to bury

their carcasses in our stomachs, as do the savage beasts of the forest, is made possible only by the fact that the ancient savage still leaps and yells in our hearts.

The natural order makes the vegetable world the means of gathering and storing energy, and making it into forms usable by the sentient beings that compose the animal world, the one gathering and storing in order that the other may expend. When animal eats vegetable, there is no pain, no sorrow, no sadness, no robbery, no deprivation of happiness, no sunlight shut out from eyes that were made to see, no sweet melodies forever shut away from ears that were made to hear, no simple delights denied to beings that God made, if not in his own image, at least so nearly like his image, man, that the man whose eyes have been enlightened by the study of nature may look down and see in the millions of beings that God has made to share with him the divine spirit, the breath of life, some traits of himself that must now and then bring blushes to his cheek or strike deep into his soul barbed arrows of remorse.

When man slays to eat, what a picture arises!

"Deaf to the calf that lies beneath the knife,
Looks up, and from her butcher begs her life;
Deaf to the harmless kid, that, ere he dies,
All methods to procure thy mercy tries,
And imitates in vain thy children's cries!
Where will he stop who feeds with household bread,
Then eats the poultry which before he fed?"

—Ovid.

Man rears his cattle, his sheep, and his poultry much like household pets. His children make his lambs their playmates. Side by side his oxen toil with him in the field. In return for kindness, they give affection. What confidence they repose in him! how faithfully they serve! With winter's frost an evil day arrives,—a day of massacre, of perfidy, of assassination and bloodshed. With knife and ax he turns upon his trusted friends,—the sheep that kissed his hand, the ox that plowed his field. The air is filled with shrieks and moans, with cries of terror and despair; the soil is wet with warm blood, and strewn with corpses.

Is there a brute on earth that would be capable of such a crime? In such an act have we

not the veritable spirit of murder in an aggravated form? Let us listen to the appeal of a pagan who lived five centuries before Christ (Pythagoras) :

"Whoever was the wretch (and cursed be he)
That envied first our food's simplicity,
The essay of bloody feasts on brutes began,
And after forged the sword to murder man,—
Had he the sharpened steel alone employed
On beasts of prey that other beasts destroyed
Or man invaded with their fangs and paws,
This had been justified by Nature's laws
And self-defense: but who did feasts begin
Of flesh, he stretched necessity to sin.
To kill man-killers, man has lawful power,
But not the extended license to devour.
Take not away the life you can not give;
For all things have an equal right to live:
Kill noxious creatures, where 'tis sin to save;
'Tis only just prerogative we have:
But nourish life with vegetable food;
And shun the sacrilegious taste of blood."

Well did Plutarch say, "Alas, for our savage inhumanity! It is a terrible thing to see the tables of rich men decked out by those layers-out of corpses, the butchers and the cooks."

An eminent London journalist some years ago made an investigation of the relation of flesh eating to musical ability, and found that

very few singers came from families or countries addicted to flesh eating. A gentleman whose business it was to seek out and train singers for the stage asserted that very few good voices were found in England, where meat is freely eaten, whereas among the vegetarian Irish it is common to find young women who can "sing like nightingales." Sweden is a land of sweet singers because a land of grain.

Among birds, songsters subsist upon grains, fruits, and nuts. Carnivorous birds do not sing; they croak and caw. Parrots, without doubt the most intelligent of birds, are frugivorous.

Remenyi, the famous Hungarian violinist, at the advanced age of more than sixty years, still had a countenance as fresh as a man of thirty-five or forty, and free from wrinkles or other signs of old age, a fact which he attributed to his vegetarian habits and his total abstinence from all alcoholic liquors and tobacco.

Edison, the greatest of modern inventors, eats meat very sparingly. Wendell Phillips, the orator and reformer, stated to the writer

a few years before his death that he had been a vegetarian for forty years as was Bronson Alcott. Emerson, Thoreau and Margaret Fuller were friendly to the meatless diet as were also Horace Greeley and a large coterie of kindred spirits in the famous Brook farm experiment.

The greatest philosopher of ancient times, Pythagoras, was a most earnest apostle of vegetarian principles, and gathered about him a group of enthusiastic disciples.

It was the influence of Pythagoras upon Lord Byron that led him to adopt a vegetarian regimen as a means of maintaining mental and moral equilibrium. A man whose bill of fare consists chiefly of flesh food must expect to find himself more nearly related to the animal in his instincts than the man who satisfies his palate with nuts, fruits, and farinaceous seeds,—the primitive diet of the human family. Byron refused to eat flesh because, as he said, "It makes me ferocious." Writing in his journal in 1814, he said, "Meat I never touch. . . . The worst is, the devil always comes with it till I starve him out; I will not be the slave of any appetite."

No man knew better than Byron, a man of strong appetites and passions, the influence of diet upon both mind and body. Many have recognized the same truth which he expressed, but comparatively few have shown the same resolution in making a practical application of it. Byron finally succumbed to his appetites, however, and died a drunkard and a glutton.

It is interesting to note in this connection the difference in character between flesh-eating human beings and carnivorous lower animals, and those men and animals that subsist upon the natural products of the soil. That the ferocity of the lion, the tiger, and the wolf, which stands out in such contrast with the docility and amiability of the ox, the camel, the antelope, the reindeer, the rabbit, the elephant, and other vegetable-eating animals, is due to the difference in dietary is clearly shown by the fact that tame bears and domesticated hogs, though gentle and tractable when fed upon a dietary from which flesh is excluded, very soon become highly ferocious when fed upon meat.

The ancient vegetarian races of Mexico and

Peru had attained to a high degree of civilization when discovered by Cortez, and were certainly far more gentle and amiable in character than were their flesh-eating conquerors, whose treachery and cold-blooded atrocities so nearly resulted in the complete extinction of a noble race.

An eminent English lady, Mrs. Ernest Hart, wife of the editor of the *British Medical Journal*, stated in an article contributed to *The Hospital* that in her opinion the unhappy, miserable home life which is so common in England, is due to the free use of flesh foods in that country. She held up in contrast with the English home the domestic peace and happiness that prevail in the homes of the rice-eating Japanese, where harsh words are unknown, and where exquisite politeness is universally practised, even among children playing upon the streets. The writer has been frequently informed by missionaries that urbanity of temper is almost universal among the Japanese, who have been a vegetarian people for many centuries. Their disgust for flesh is well illustrated by a story told the writer by a clergyman who had long been a

missionary in Japan. He stated that while having a portion of meat cooked in his house upon one occasion, his housekeeper called upon him and said, with great firmness and dignity, "Honorable sir, I can no longer endure the smell of this burning flesh. It is very horrible."

A native Hindu once said to a missionary, "I have heard that in your country people sometimes kill hogs, cut them in pieces, pack them in barrels, and then eat them after they have been dead many months. Tell me, is it possible that this can be true?"

The business of slaughtering animals is a training school for murderers. Some time ago a boy murderer, less than a dozen years of age, took the lives of several children and playmates, enticing them into a neglected cellar for the purpose, and there cutting their throats from ear to ear. He was the son of a butcher who was assisted in the business by his wife. It is a significant fact that in most countries it is a recognized custom to exclude butchers from juries in the trial of cases of murder.

HISTORICAL FACTS AND AUTHORITATIVE OPINIONS

The Biblical Teaching About Flesh-Eating

Since Elliot, of Oxford, has told us that in the early history of the human race "there was not, so far as we are aware, any carnivorous creature," we have scientific verification of the accuracy of the Biblical account of the dietetic habits of the first men who appeared on the earth, as recorded in Genesis 1:29; "And every fruit tree bearing fruit and every herb bearing seed, to you they shall be for meat." And it is almost as interesting to note that among the most ancient nations, Sumerians, Assyrians, Egyptians, Greeks, and Romans, the traditions of their earliest times indicate that primitive man was not an eater of flesh.

In those happy days, when man and animals were living in harmony with primitive biologic law, according to our modern paleontologists there was no such thing as disease. No germ had power successfully to attack the human organism (Moodie). With the degeneration of man and other animals which ac-

accompanied the introduction of flesh-eating came vulnerability to germs and a thousand maladies which have destroyed many races of men and animals, threaten to destroy the whole human race, and will ultimately accomplish this unless the present rapid, downward trend is checked and reversed by a return to the natural or biologic life.

As regards the origin of flesh-eating, Porphyry, one of the most eminent historians of the early Christian centuries, tells us that, according to Syrian historians, the early inhabitants of that part of the world abstained from all flesh even in sacrifice. The killing and eating of animals first occurred in the act of propitiatory sacrifice, but it was long before the use of flesh became general. Porphyry also quotes Asklepiades as saying in his *History of Cyprus and Phoenicia* that "no living being was sacrificed to heaven, nor was there even any expressed law on the subject, since it was *forbidden by the law of nature*." By slow degrees the priests became eaters of flesh as a part of their sacrificial ceremonies and later the practice became general. The Persian *magi* of his time, he tells us, "neither

eat nor kill any living being." At least this was true of those belonging to the highest order.

According to the Bible, flesh-eating was not practiced before the flood. Evidently the animals gathered into the ark were not at that time carnivorous. No ark could have contained a sufficient number of sheep, with hay and grain to feed them, to supply enough meat to support a single pair of lions for a year. The conditional permission to eat flesh was given after the flood. It is important to note that, according to the Biblical account (Gen. 9), when man was given permission to kill animals and eat their flesh, animals were also given permission to slay and eat human beings: "And your life will I seek; at the hand of every beast will I seek it."

Orthodox Hebrews at the present day carefully abstain from the eating of blood and remove the blood from the flesh by covering with salt over night and careful washing.

The attitude of the Bible writers toward flesh-eating is the same as toward polygamy. Polygamy as well as flesh-eating was tolerated under the social and religious systems of the

old Hebrews and even during the early centuries of the Christian era; but the first man, Adam, in his pristine state in the Garden of Eden was both a monogamist and a flesh-abstainer. If the Bible supports flesh-eating, it equally supports polygamy; for all the patriarchs had plural wives as well as concubines. Christian ethics enjoin a return to the Edenic example in matters matrimonial. Physiologic science as well as human experience calls for a like return to Eden in matters dietetic.

Apostles Who Were Flesh Abstainers

The *Homilies* of Clement, according to Howard Williams, represent St. Peter as being a strict flesh-abstainer, living "upon bread and olives only, with the addition rarely of kitchen herbs." This information it is claimed was given by St. Peter himself to Clement of Rome. We are also assured that St. Matthew "lived upon seeds and hardshell fruits and other vegetables, without touching flesh;" and Eusebius states that St. James "never ate any animal food." According to St. Augustine, he lived upon seeds and vegetables, never tasting flesh or wine."

Dean Stanley points out certain evidence that St. John was an adherent of the Essenian philosophy, and St. Chrysostom in commanding the abstemiousness of the Essenes or ascetics declares: "The unnatural eating of flesh-meat is of demoniacal origin, and was introduced by those giants who, from their bastard nature, took no pleasure in pure nourishment, and only lusted after blood. Therefore, the eating of flesh is as polluting as the heathen worship of demons, with its sacrifices and its impure feasts, through participation in which, a man becomes a fellow-dietist with demons."

The Essenes Were Flesh-Abstainers

The Essenes were a Jewish sect the origin of which is lost in antiquity. They held many views in common with Christianity, and many of the early Christians seem to have been drawn from this sect. There are those who believe that the Christian movement really originated in this ancient religious order. The *Encyclopedia Britannica* gives a highly interesting account of this wonderful body of reformers, from which we quote:

The color of their garments was always white. Their daily routine was prescribed for them in the strictest manner. Before the rising of the sun they were to speak of nothing profane, but offered to it certain traditional forms of prayer as if beseeching it to rise. Thereafter they went about their daily tasks, working continuously at whatever trade they knew till the fifth hour, when they assembled, and, girding on a garment of linen, bathed in cold water. They next seated themselves quietly in the dining hall, where the baker set bread in order, and the cook brought each a single dish of one kind of food. Before meat [food] and after it grace was said by a priest. After dinner they resumed work till sunset.

As a result of the ascetic training of the Essenes, and of their temperate diet, it is said that they lived to a great age, and were superior to pain and fear. During the Roman war they cheerfully underwent the most grievous tortures rather than break any of the principles of their faith. In fact, they had in many respects reached the very highest moral elevation attained by the ancient world; they were just, humane, benevolent, and spiritually-minded; the sick and aged were the objects of a special affectionate regard; and they condemned slavery, not only as an injustice, but as an impious violation of the natural brotherhood of men.

According to Clement of Alexandria (220 A. D.), the Essenes were strict abstainers from flesh foods.

Josephus says that the Essenes lived the same kind of life as did the Pythagoreans, and adds:

Herod had these Essenes in the highest honor, and thought more of them than their moral nature required. They offer no sacrifice, because they have more pure lustrations of their own; their course of life is better than that of other men, and they entirely addict themselves to husbandry. It also de-

serves our admiration, how much they exceed all other men that addict themselves to virtue, and this in righteousness; and indeed to such a degree that, as it hath never appeared among any other men, neither Greeks nor Barbarians—no, not for a little time—so hath it endured a long while among them. They are long lived also, insomuch that many of them live above a hundred years.

Diet of the Ancient Greeks

Hon. K. Russell in his excellent treatise, *Strength and Diet*, tells us that:

Hesiod, the Greek poet, speaking of the food of the earliest people, says, “the uncultivated fields afforded them their fruits, and supplied their bountiful and unenvied repast.”

Herodotus, the celebrated historian, who wrote about four hundred and forty-five or fifty years before Christ, relates that “upon the death of Lycurgus, the Lacedemonians, meditating the conquest of Arcadia, were told by the oracle that there were many brave acorn-eaters in that country, who would repel them if they attempted to carry their arms thither,—as it afterwards happened.”

Hippocrates, called the father of medicine, who lived about four hundred years before Christ and who was a physician of great talents and extensive observation and research, says that “in the beginning man subsisted on the spontaneous products of the earth, and received his food in the same simple and natural condition as the lower animals did.”

Galen, a famous Roman physician, who flourished in the second century, tells us that “acorns afford as good nourishment as many sorts of grain; that in ancient times men lived on acorns only; and that the Arcadians continued to eat them long after the rest of Greece had begun to make use of bread-corn.”

Porphyry, a platonic philosopher of the third century—a man of great talents and learning and of very extensive re-

search and observation, who investigated the subject of human diet with great care and diligence—says that "*the ancient Greeks lived entirely on the fruits of the earth.*"

It is well known also that the Romans, not only in the earliest period of their history, but at the time of their greatest vigor and efficiency, when their small and invincible armies were always victorious, and when the success of battle depended less on the art of war than on the physical power and personal prowess of the individual leaders and soldiers, were exceedingly simple and natural in their diet; and it was not till the artificial refinements and the excesses of luxury had relaxed their sturdy frames and rendered them effeminate, sensual, and selfish, that they were unable to withstand even the smaller numbers of those rugged barbarians whom they affected to despise.

When Boadicea, the queen of the ancient Britons, was about to engage the Romans in pitched battle in the days of Roman degeneracy, she encouraged her army with a pathetic speech in reference to the wrongs and outrages which they had suffered from their foreign oppressors, and urged in particular the following considerations: "The great advantage we have over them is that they cannot, like us, bear hunger, thirst, heat, nor cold. They must have fine bread, wine, and warm houses. Every herb and root satisfies our hunger, water supplies the want of wine, and every tree is to us a warm house." In those times, says the noble historian on whose authority I state this, "our fathers were robust both in mind and body, and could bear without much pain what would totally overwhelm us."

According to Plutarch, "the ancient Britons began to grow old at one hundred and twenty." They were remarkable for their athletic form, great strength, and extraordi-

nary capacity for bearing hardships of all kinds. "Their food," says Goldsmith, "consisted almost exclusively of acorns, berries, herbs, roots, and water."

According to Eusebius, one of the historians of the first Christian centuries, "Biblias, under torture, bravely protested against the charges of murder brought against Christians, who considered it unlawful even to taste the blood of irrational animals."

King Cyrus a· Flesh-Abstainer

According to Rollin, "Cyrus, who raised Persia from an obscure, rude colony into one of the most powerful and splendid empires the world ever saw, who performed more extraordinary marches, fought more battles, won more extraordinary victories, and exhibited more personal prowess and bodily power of effort and endurance than almost any other general who ever lived, subsisted from childhood on the simplest and plainest diet of vegetable food and water, . . . and the Persian soldiers who went with him through all his career of conquest . . . strictly adhered to the same simplicity of vegetable diet (bread,

cresses, vegetables, and water) throughout the whole of their heroic course."

Julius Caesar's Army Ration

The Roman soldier conquered the world on wheat. A Latin professor discarded flesh after reading Caesar's account of an experience with his army in Spain. Meat was abundant there, but grain was scarce. The soldiers showed the ill effects to such a marked degree that the great warrior broke camp and moved to another place where their customary ration of wheat was available.

Diet of Peruvian Soldiers

A South American traveler in an account of the Peruvians tells us of this remarkable performance of a military commander with his vegetarian army:

General Valdez, wishing to take the enemy by surprise, selected between two and three thousand men, ordered them to leave their women and all unnecessary baggage behind, and every man to fill his pockets with parched corn for his food. Thus prepared, he appointed, each morning, the place of meeting and stopping for the night, and then left every man to take his own way as he pleased. In this manner, General Valdez led his army near Lima to the southward of Arequipa, a distance of 250 leagues, or 750 miles, in eleven days, or

more than sixty-eight miles a day, for eleven days in succession; and at the close of this forced march, met and routed the patriot army of between three and four thousand men. These Peruvians, says a highly intelligent gentleman who has spent twenty years among them, are a more hardy race, and will endure more fatigue and privation, than any other people in the world. They subsist wholly on vegetable food, and, being very improvident, their diet is generally coarse and scanty. Parched corn is their principal, and generally their exclusive, article of food when engaged in any particular enterprise or effort which requires great activity and power of body; at other times they subsist on such of the various products of their climate as they happen to have at hand. In traveling, and in many other respects, the women are quite equal to the men in muscular power and agility.

Diet of the Athletes of Ancient Greece

In the early days of Greece, when athletic games and the training of athletes were first instituted, the contestants, according to the historian, Rollin,

"had no other nourishment but dried figs, nuts, the recent curd of milk, or new cheese and boiled grain, or a coarse kind of bread called *maza*. They were absolutely forbidden to use wine, and required to observe the strictest continence. Every measure was taken to keep the vital powers in the most healthy and vigorous state, and to develop the most compact and powerful muscles. As the time of their public performances drew near, they were trained with increased care and industry, and were rubbed and exercised in such a manner as to consolidate, increase, and strengthen the muscles in the greatest possible degree.

"In later times, after animal food had begun to be common among the people, and flesh-meat was found to be more stim-

ulating, and to render their pugilists and gladiators more ferocious, a portion of flesh was introduced into the diet of the *athletae*. But, according to the testimony of early Greek writers, it was found that the use of this kind of aliment made them the most sluggish and stupid of men; and, therefore, those who had the training of the *athletae* withheld flesh meat from them entirely, till a short time before their public performance, and then it was introduced in very small quantities at first, and gradually increased. Yet with all this care, the stupefying effect of the flesh-meat was so manifest, and especially on the mental powers, that the stupidity of the *athletae* became proverbial."

The Ancient Philosophers Were Flesh-Abstainers

Pythagoras, who lived from 570 to 470 B. C., and is called the father of Greek philosophy, opposed flesh-eating most earnestly. He was the father of Socrates, who in turn taught Plato, the teacher of Aristotle, who has been teaching the whole civilized world for many centuries.

Alcibiades, who shared the same tent with Socrates in the winter siege of Potidea, tells how easily Socrates bore the intense cold of those northern regions, and how "with his bare feet on the ice and in his ordinary dress he marched better than any of the other soldiers who had their shoes on." His ability to

endure hardships was doubtless due largely to the extreme simplicity of his life. When the Thessalian princes once tried to tempt him by lavish offers of money to settle in their court, he replied that his bodily wants were few, for he could buy four measures of meal for an *obolus* (three cents) at Athens, and there was excellent spring water to be got there for nothing.

Pythagoras not only by voice and pen opposed the use of flesh food as unnatural and unphilosophical, but established a colony, Crotona, from which meat was excluded. He lived to a very advanced age, and has exercised during all the ages since a great influence through his philosophical teachings. The Latin poet, Ovid, in the fifteenth book of his *Metamorphoses* gives a poetic account of the great philosopher's views on human diet. We quote as follows, from Dryden's admirable translation:

He first the taste of flesh from tables drove,
And argued well, if arguments could move:
O mortals, from your fellows' blood abstain,
Nor taint your bodies with a food profane,
While corn and pulse by Nature are bestowed,
And planted orchards bend their willing load;



SENECA



PYTHAGORAS



CHEVREUL
(Age 102 Years)



LEO TOLSTOI

While labored gardens wholesome herbs produce,
And teeming vines afford their generous juice;
Nor tardier fruits of cruder kind are lost,
But tamed with fire, or mellowed by the frost;

• • • • •

While earth not only can your needs supply,
But, lavish of her store, provides for luxury;
A guiltless feast administers with ease,
And without blood is prodigal to please.
Wild beasts their maws with their slain brethren fill;
And yet not all, for some refuse to kill;
Sheep, goats, and oxen, and the nobler steed,
On browse, and corn, and flowery meadows feed.
Bears, tigers, wolves, the lion's angry brood,
Whom Heaven indued with principles of blood,
He wisely sundered from the rest, to yell
In forest, and in lonely caves to dwell;
Where stronger beasts oppress the weak by night.
And all in prey and purple feasts delight.
Oh, impious use! to Nature's laws opposed,
Where bowels are in other bowels closed;
Where, fattened by their fellows' fat, they thrive;
Maintained by murder and by death, they live.
'Tis then for naught that Mother Earth provides
The stores of all she shows, and all she hides,
If men with fleshly morsels must be fed,
And chaw with bloody teeth the breathing bread;
What else is this but to devour our guests,
And barb'rously renew Cyclopean feasts?
We, by destroying life, our life sustain,
And gorge the ungodly maw with meats obscene.
Not so the golden age, who fed on fruit,
Nor durst with bloody meals their mouths pollute.
Then birds in airy space might safely move,
And timorous hares on heaths securely rove;

Nor needed fish the guileful hooks to fear,
For all was peaceful; and that peace sincere.
Whoever was the wretch (and cursed be he)
That envied first our food's simplicity,
The essay of bloody feasts on brutes began,
And after forged the sword to murder man—
Had he the sharpened steel alone employed
On beasts of prey that other beasts destroyed,
Or man invaded with their fangs and paws,
This had been justified by Nature's laws
And self-defense: but who did feasts begin
Of flesh, he stretched necessity to sin.
To kill man-killers, man has lawful power,
But not the extended license to devour.

From whence, O mortal man, this gust of blood
Have you derived, and interdicted food?
Be taught by me this dire delight to shun,
Warned by my precepts, by my practice won;
And when you eat the well-deserving beast,
Think on the laborer of your field you feast!

Porphyry encountered even in his day (third century A.D.) the objection that if animals are not eaten they will over-run us, and made the following sensible reply:

"Though we abstain from eating very many, such as dogs, wild beasts, rats, lizards, and others, there is yet no fear that we should ever suffer from famine in consequence of their excessive multiplication; and again, it is one thing to have to kill, and another to eat, since we have to kill many ferocious animals whom we do not also eat."

Writing to his friend Firmus, who had given up the Pythagorean practice, after having been a flesh-abstainer, Porphyry said:

"I cannot believe that your change of diet is due to reasons of health, for you yourself have constantly affirmed that a vegetable diet is much more suitable than any other, *not only to give perfect health but even a philosophic and balanced judgment, as a long experience had taught you.*"

Plutarch's Essay on Flesh-Eating

It would be hard to find in literature a more scathing denunciation of the practice of flesh-eating than that of Plutarch, the famous biographer, in his *Essay on Flesh-Eating*. Here are a few paragraphs:

You ask me upon what grounds Pythagoras abstained from feeding on the flesh of animals. I, for my part, marvel of what sort of feeling, mind, or reason that man was possessed who was the first to pollute his mouth with gore and to allow his lips to touch the flesh of a murdered being: who spread his table with the mangled forms of dead bodies, and claimed as his daily food what were but now beings endowed with movement, with perception, and with voice.

How could his eyes endure the spectacle of the flayed and dismembered limbs? How could his sense of smell endure the horrid *effluvium*? How, I ask, was his taste not sickened by contact with festering wounds, with the pollution of corrupted blood and juices? "The very hides began to creep, and the flesh, both roast and raw, groaned on the spits, and the slaughtered oxen were endowed, as it might seem, with human

voice." This is poetic fiction; but the actual feast of ordinary life is, of a truth, a veritable portent—that a human being should hunger after the flesh of that even actually bellowing before him, and teach upon what parts one should feast, and lay down elaborate rules about joints and roastings and dishes. The first man who set the example of this savagery is the person to arraign; not, assuredly, that great mind which, in a later age determined to have nothing to do with such horrors. . . .

Reason proves both by our thoughts and our desires that we are (comparatively) new to the reeking feasts of kreon-phagy. Yet it is hard, as says Cato, to argue with stomachs since they have no ears; and the inebriating potion of Custom has been drunk, like Circe's, with all its deceptions and witcheries.

Said Diogenes: "We might as well eat the flesh of men as of other animals."

Fleshless Diet of a Roman Emperor

According to Porphyry, the famous Roman emperor Julian adhered to a "light and sparing diet which was usually of the vegetable kind," as the result of which his body was "always free and active for the various and important business of an author, a pontiff, a magistrate, a general and a prince." The prodigious labors of this abstemious ruler are thus described:

In one and the same day he gave audience to several ambassadors, and wrote or dictated a great number of letters

to his generals, his civil magistrates, his private friends, and the different cities of his dominions. He listened to the memorials which had been received, considered the subject of petitions, and signified his intentions more rapidly than they could be taken in shorthand by the diligence of his secretaries. He possessed such flexibility of thought, and such firmness of attention, that he could employ his hand to write, his ear to listen, and his voice to dictate, and pursue at once three several trains of ideas without hesitation and without error. While his ministers reposed, the prince flew with agility from one labor to another, and, after a hasty dinner, retired into his library till the public business, which he had appointed for the evening, summoned him to interrupt the prosecution of his studies. The supper of the emperor was still less substantial than the former meal; his sleep was never clouded by the fumes of indigestion. . . . He was soon awakened by the entrance of fresh secretaries, who had slept the preceding day, and his servants were obliged to wait alternately, while their indefatigable master allowed himself scarcely any other refreshment than the change of occupation.

The Meatless Diet Endorsed by Gautier, the Eminent French Authority

As to the sufficiency of a non-flesh dietary—that is, a diet of fruits, vegetables, cereals, and nuts supplemented by milk and other daily products—all who have made an intelligent study of this subject will be ready to agree with the eminent Professor Gautier, of Paris, who maintained that a diet consisting of a variety of fruits, grains and other products of the vegetable kingdom, supplemented by milk,

butter and other dairy products is fully competent to bring the human body to complete development and to sustain it in full health and vigor.

The objection which has been urged against the use of vegetable foods, that they are not so easily absorbed as are animal foods, is justly answered by Gautier in the remark: "But these figures would change if the food, instead of being swallowed *en bloc* and often badly masticated, were taken in the form of powders and purees." This great authority gives to a rational non-flesh dietary the following unqualified endorsement:

Mitigated by the addition of milk, cheese, butter, fats, and eggs it has great advantages; that it alkalizes the blood, accelerates oxidations, diminishes toxins; that it exposes one much less than the ordinary diet (especially if the latter is too rich in meats) to diseases of the skin, arthritism, and congestion of the internal organs. This mitigated vegetarian diet tends to make us peaceful and not aggressive and violent beings. It is practical and rational. It should be accepted and commended by those who pursue the ideal of the formation and education of gentle, intelligent, artistic, and nevertheless prolific, vigorous, and active races.

Views of Seneca, the Roman Philosopher

Struck by such arguments, I also have given up the use of the flesh of animals, and at the end of the year my new habits have become not only easy to me, but delicious; and it even seems to me that my intellectual aptitudes have been more and more developed.

Diet of the Ancient Sumerians

According to Professor Price, of the University of Chicago, one of the world's greatest authorities in the languages of antiquity, the ancient Sumerians, a people who lived two thousand years before the time of Abraham, ate little meat and never took the life of animals or partook of flesh foods except in connection with religious rites and ceremonies.

Mr. R. Russell, an English writer, published some years ago a most interesting volume entitled *Strength and Diet*, from which many of the following paragraphs are quoted or abstracted:

Gout is known in Persia, where only the rich eat flesh, as the rich man's disease. (*Proc. Roy. M. and Chir. Soc.*)

Dr. Guy, from his observations on English prisons, stated that "we possess conclusive evidence of the sufficiency of a diet from which meat is wholly excluded, and even of a diet consisting wholly of vegetable matter." (*F. W. Pavy, M. D., F. R. S.*)

Dr. Sims Woodhead, M.D., F.R.S., has not the slightest hesitation in saying that men may and do live in full health and vigor on a carefully selected dietary from which flesh food is excluded.

Professor John Smith, an eminent English authority, defended the meatless fare on scientific grounds. Russell thus summarizes his views:

The present constitution of man, like the original, is best fitted for a diet derived directly from the vegetable kingdom. Keen scent, strong talons, a simple stomach, a short alimentary canal, sharp angular teeth, and a cunning disposition generally mark the carnivorous animal. The canine teeth are long, conical, acute, and strong; there is not the slightest resemblance between these cuspids and the so-called "canine" teeth of man. In the horse, camel, and stag they are pointed and large, much larger than in man; yet it is not contended, as in the case of man, that these beasts should be carnivorous to act up to their dental outfit. The cheek-teeth in the lower jaw of man are, like those of herbivorous and frugivorous animals, simply raised into rounded elevations and directly opposed to the upper teeth. In the carnivora these lower teeth are shut within the upper, so as to tear and cut flesh. The lateral motion of the jaws in man is like that of the frugivora and quite unlike the motion up and down in the carnivora. The secretion from the salivary glands, especially in vegetarian races, is in man like that of the herbivora, though the glands are smaller. The stomach is something between that of most carnivora and most herbivora. Again, in the immense number of perspiratory glands of the skin, man differs from the carnivora.

Said the late Professor Metchnikoff, one of the world's ablest biologists: "Hufeland advised that we should use vegetable rather than animal food, as animal food is more liable to putrefaction, whilst vegetable substances contain an acid principle which retards our mortal enemy putrefaction. Here the physician of a day long past anticipates one of the discoveries of modern science."

Lord Playfair, an eminent English physician, states that "animal [meat] diet is not essential to man."

The *British Medical Journal*, a leading authority, condemns the use in cases of kidney disease of meat, beef tea, meat soups and extracts, "which contain the maximum of excretion products and the minimum of nutritive matters;" and recommends a lacto-vegetarian diet, which, "even if it does not bring about complete repair, will do less than any other diet to increase the kidney lesion; and, as regards the blood, will do more than any other diet to keep it free from uric acid and other toxic products of nitrogenous metabolism."

Eminent Modern Flesh Abstainers

The renowned Professor Hyrtl of Vienna, one of the world's most eminent pathologists, after renouncing the use of meat, declared that he could think more clearly and calmly, that he "felt gladder and fresher, and could work better than in the days of his youth." Professor Karl Opfel, of Frankfort, reported an identical experience. Richard Wagner was an enthusiastic food reformer. He re-

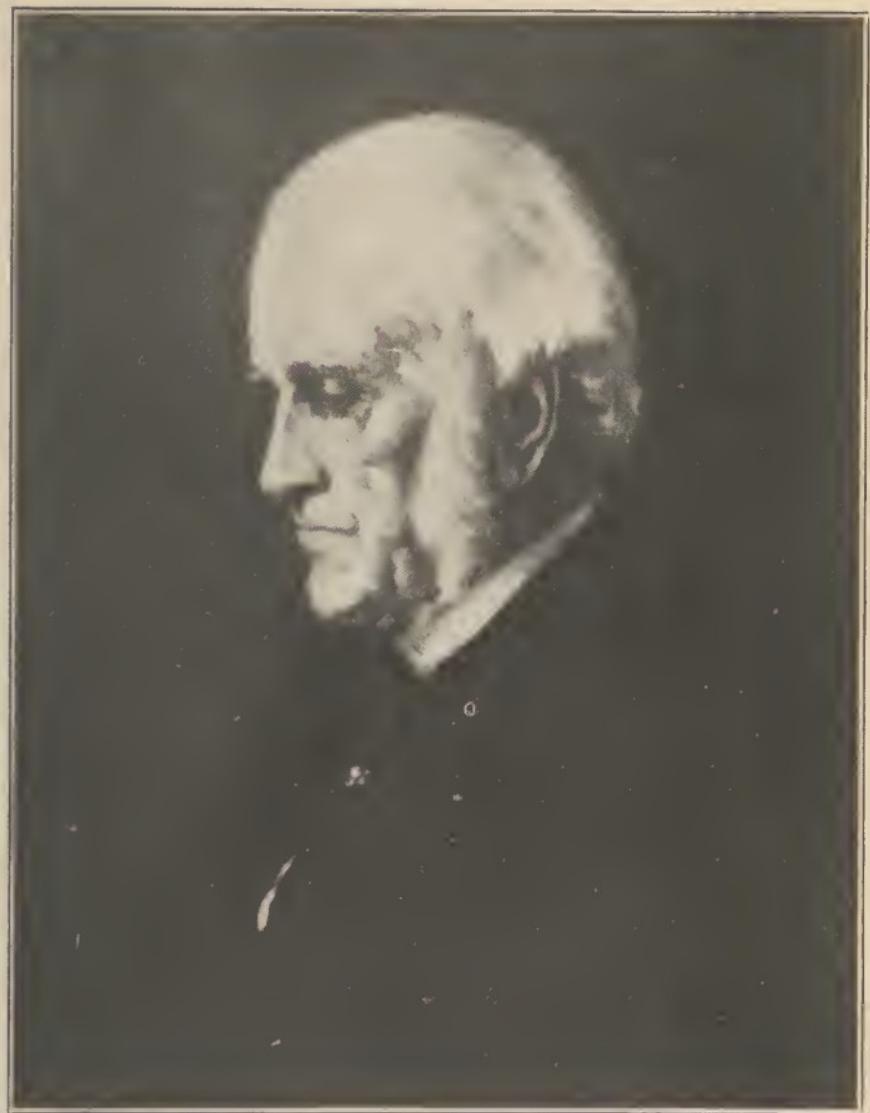
garded diet reform as the only hope for the regeneration of the race.

The famous English statesman, Cobden, in an address at Bradford stated that of the 658 members of the House of Commons a Mr. Brotherton and Col. Thompson were best able to endure the fatigues of parliamentary work. Both these men were flesh-abstainers.

Isaac Newton, while engaged on one of the most prodigious tasks ever accomplished by the human mind, was sustained by a simple diet of bread and water.

It is well known also that among the bravest and most hardy and enduring soldiers that composed the army of Napoleon Bonaparte in his wonderful career of carnage and conquest, were those who had all their lives subsisted on a coarse vegetable diet. "The Polish and Hungarian peasants from the Carpathian mountains," says a young Polish nobleman, "are among the most active and powerful men in the world; they live almost entirely on oatmeal bread and potatoes. The Polish soldiers under Bonaparte," continues he, "would march forty miles in a day, and fight a pitched battle, and the next morning be fresh and vigorous for further duties." (Russell.)

The late Count Tolstoy was for many years a strong advocate of the biologic diet. A report circulated some years before his death, to the effect that he had returned to flesh-eating, was wholly without foundation. Three



DR. STEPHEN SMITH

Died in his 100th year.



OLD PARR

Died at the Age of 152 Years and 9 Months.
Buried in Westminister Abbey.

He was good to himself and lived the simple life.

years before his death, a letter received from his daughter, written at her father's request, stated, "He is a strict vegetarian himself." Count Leo Tolstoy, Jr., whom the writer met in Petrograd in 1907, stated that his father closely adhered to his vegetarian diet notwithstanding the fact that many of his friends urged him to return to flesh-eating.

The late Hon. John Bigelow, of New York, who was nearly one hundred years old at the time of his death, had been a flesh-abstainer for many years and thereby no doubt greatly prolonged his life.

William Cullen Bryant, founder of the *New York Evening Post*, was likewise a flesh-abstainer and at an advanced age was remarkably robust and active, his death being caused by an accident.

Dr. Stephen Smith, the famous New York surgeon, founder of the American Public Health Association, living at the time of this writing in his hundredth year, doubtless owes his great longevity, notwithstanding a rather feeble constitution, to temperate living. His diet during the first seventy years of his life on account of a chronic bowel complaint was

almost exclusively bread and milk, a diet which, according to the views of Metchnikoff and others, is most conducive to long life, by promoting a non-putrefactive intestinal flora.

George Bernard Shaw, the English dramatist, is a very militant flesh-abstainer, and is himself a good example of the advantages of a fleshless diet in promoting vigor of mind and body.

Robert Louis Stevenson, in his *In the South Seas*, shows that the average European is little less cruel than the savages of the Cannibal Islands. He says: "We consume the carcases of creatures with like appetites, passions, and organs as our own. We feed on babes, though not our own, and fill the slaughter-houses daily with screams of pain and fear."

"In 1747, John Wesley wrote to the bishop of London: 'Thanks be to God, since the time I gave up the use of flesh meat and wine, I have been delivered from all physical ills'."

Benjamin Franklin was for years a strict flesh-abstainer, living chiefly on bread and milk. His biographer tells us that at one time he "set to work to persuade his companions to

take a breakfast of porridge and gained many converts." While he adhered to his plain bill of fare he was wonderfully athletic and a famous swimmer. In later years he became a gourmand and suffered dreadfully from gout in consequence until, late in his life, he found relief by returning to an abstemious mode of living.

'Vegetarian Monks

For hundreds of years there existed in France an order of monks, an offspring of the Cistercians, known as Trappist monks, who have been noted alike for their simplicity of life and their remarkable health and longevity. More than sixty years ago a company of these monks came to this country from Ireland, where they had a large monastery, established when they were expelled from France during the French Revolution. The pioneers in this country settled in Iowa, about twelve miles from Dubuque.

The food of the Trappists is as simple as possible. A slice of brown bread, with a glass of water, constitutes the morning meal. The noon meal consists of soup and vegetables,

with bread and water. The soup contains neither butter, oil, nor fat of any kind. Vegetables are cooked in water, to which only a little salt is added. Meat, fish, and eggs never enter into the dietary of these monks.

The Trappist monks inure themselves to privations and abjure all luxuries, even a great share of what are ordinarily considered necessities. The Trappist frequently sleeps upon a bare board, without covering, pillow, or mattress. He rises at two o'clock in the morning, and on feast days at midnight. From this early hour until eight o'clock P. M., when he retires, every moment is occupied either in toil or in religious duties.

Among the members of this order are to be found a large proportion of very old men. The statistics of France show that these monks are the longest-lived men in that or any other country. The majority die of old age, except in cases where chronic disease was contracted before entering the monastery; and even in these cases it is claimed that life is greatly prolonged by their simple mode of living. A newspaper correspondent who recently visited an establishment of these monks in that coun-

try states that "the brother physician of Le Grande Trappi, during a residence of twenty-eight years, has not known a case of apoplexy, dropsy, gout, or cancer"; and "what is most strange," he adds, "is that the most terrible epidemics which have visited the country around the Abbey have invariably stopped at its threshold."

Although the pioneers of the order in this country numbered but seven, the community has now increased to seventy. It is said that the order owns 5,000 acres of the best farming land of Iowa, which they till with their own hands, raising the finest cattle, sheep, and horses in the country.

While the life of these monks is no doubt unnecessarily severe in its discipline, it certainly teaches a most useful lesson in demonstrating the fact that the luxurious habits commonly indulged in by civilized people are not only non-essential to life and health, but highly injurious.

Thoreau on the Fleshless Diet

Said this noted advocate of the simple life:

It may be vain to ask why the imagination will not be reconciled to flesh and fat. I am satisfied that it is not. Is it not a reproach that man is a carnivorous animal? Truly,

he can and does live in a great measure by preying on other animals; but it is a miserable way, as any one who will go snaring rabbits or slaughtering lambs may learn; and he will be regarded as a benefactor of his race who shall teach man to confine himself to a more innocent and wholesome diet. . . . I have no doubt that it is a part of the destiny of the human race, in its gradual improvement, to leave off eating animals, as surely as the savage tribes have left off eating each other when they come in contact with the more civilized.

A Chinese Statesman's Experience

Said Wu Ting Fang, Chinese Minister to the United States, some years after visiting the Battle Creek Sanitarium and following the biologic diet for a few months: "I was a flesh-eater. I ate corpses—dead bodies of animals, and fish, the scavengers of the sea. I was afflicted with sciatica and other ills; but now that I have changed my diet and become a vegetarian my former ailments have disappeared. So, physically, I am in a better condition to live much longer than before." The eminent Chinese statesman continued the fleshless diet until his death, at the age of eighty years, from pneumonia due to extraordinary exposure.

'The Views of Two Great Naturalists

Linnæus, the greatest naturalist who ever lived and the founder of the science of botany, gave his views on the subject of man's natural diet in the following brief but lucid statement: "This species of food (vegetable foodstuffs) is that which *is most suited* to man, as is proved by the series of quadrupeds, the analogy between wild men and apes, the structure of the mouth, of the stomach, and of the hands."

The great naturalist, Buffon, was not an advocate of vegetarianism and yet he readily admits the validity of the fundamental arguments against the use of flesh. In his great work, *Historie Naturelle*, he says: "Man alone consumes and engulfs more flesh than all other animals put together. He is, then, the greatest destroyer, and he is so more by abuse than by necessity. . . . Man might, like other animals, live upon vegetables. Flesh is not a better nourishment than grains or bread."

The Poet Shelley a Food Reformer

The poet Shelley, contemporary and friend of Byron, was a diet reformer. He wrote an essay against flesh-eating and in several poems satirized the practice of slaying to eat. We quote the following from his great poem, "The Revolt of Islam."

My brethren, we are free! The fruits are glowing
Beneath the stars, and the night-winds are flowing
O'er the ripe corn; the birds and beasts are dreaming—
Never again may blood of bird or beast
Stain with his venomous stream a human feast,
To the pure skies in accusation steaming.

Shelley, together with his wife, adopted the meatless diet in 1812. His biographer, Dowden, quotes him as writing; "I continue vegetable. . . . My health is much improved by it."

A Child's Natural Repugnance to Meat

Said the wise Rousseau; "One proof that the taste of meat is not natural to the human palate is the indifference which children have for that kind of food, and the preference they give to vegetable aliments. It is of the utmost consequence not to vitiate this primitive taste

in children." Sir Henry Thompson, the great English surgeon, wrote: "Few children like that part of the meal which consists of [flesh] meat. . . . Many children manifest great repugnance to meat at first. . . . I am satisfied that if the children followed their own instinct in that matter the result would be a gain in more ways than one. . . ."

Says Professor Harry Campbell, of the N. W. London Hospital; "All children in the country help themselves largely to the vegetable diet provided by Nature. They eat herbs and berries, roots and nuts. . . . I think it may safely be said that children, as a body, prefer a vegetable to a meat diet. Almost every child prefers fruit to meat. . . . Some children manifest a great liking for meat; they may be taught to like it, just as are pigeons and other vegetable feeders."

Dudgeon mentions a fact well known to breeders of dogs—that dogs "do well on a mixed diet containing little animal flesh, and, indeed, though they have carnivorous teeth and intestines, many dogs thrive when given a strictly non-flesh diet."

It is said that the wonderful dogs of the St.

Bernard Monastery eat no flesh, being fed on bread and soup prepared from meal.

Even lions and tigers thrive on a diet containing very little meat; and in India certain fakirs keep tame tigers, to which they give no flesh food but only the same food they eat themselves, and sometimes allow them to roam at large (Russell).

Some years ago the writer visited the London Zoo to learn about the feeding of the apes and monkeys. Inquiry of the keeper elicited the information that meat was never given these animals. The same information has been obtained from various other zoological collections. Says Russell; "Experience has taught the breeder of apes that flesh makes them wilder, and causes many disorders of the stomach, bowels, kidneys, skin, etc., and, what is more important, shortens their life, so that today no breeder of apes or proprietor of a menagerie will feed them with flesh."

In the Annual Report of the Smithsonian Institute, Washington, D. C., Thurston states: "It should be at all times remembered that the teaching of comparative anatomy and general experience, so far as careful observa-

tion informs us, indicate that the vegetable starches and fats and proteins are more suitable for the animal prime motor, and even still more to the thought machine, than the carnivorous foods."

That a non-flesh diet promotes longevity is clearly shown by the fact that nearly all long-lived animals are to be found among the vegetable feeders. The examples of greatest longevity among human beings also have all been small meat eaters. Old Parr, who is reputed to have died at the age of one hundred fifty-two years and nine months, lived on black bread, buttermilk, potatoes, and greens. Doctor Harvey found his arteries free from arteriosclerosis.

Liebig on the Advantages of a Non-Flesh Diet

Liebig, the great German chemist, laid the foundation of agricultural chemistry and opened a new era in the application of chemistry to practical life. While not an advocate of vegetarianism, Liebig nevertheless does not hesitate to admit that a non-flesh diet is com-

petent to nourish the human body to perfection, and thus presents his views:

Vegetable fibrine and animal fibrine, vegetable albumen and animal albumen differ at the most in form. If these principles fail, the nourishment of the animal will be cut off; if they obtain them, then the grass-feeding animal gets the same principles in his food as those upon which the flesh-eater entirely depends. Vegetables produce in their organism the blood of all beings. So that when the flesh-eaters consume the blood and flesh of the vegetable-eaters, they take to themselves exactly and simply the vegetable principles.

Vegetable foods, in particular corn of all kinds, and through these bread, contain as much iron as the flesh of oxen or as other kinds of flesh.

The practical illustration of agricultural superiority cannot be more clearly and profoundly given than in the speech of the North Chief, which the Frenchman Crevecous has reported to us. The chief, recommending to his tribe the practice of agriculture, thus addressed it: "Do you not observe that, while we live upon flesh, the white men live upon grain? That flesh takes more than thirty months to grow to maturity, and besides is often scarce? That each of these miraculous grains of corn, which they bury in the earth, gives back to them more than a hundredfold? That flesh has four legs upon which to run away, and we have only two to overtake them? That the corn remains and grows where the white men sow it; that the winter, which for us is a time of toilsome hunting, is for them the time of rest? Therefore have they so many children, and live so much longer than we. I say, then, to each one who hears me: Before the trees over our wigwams have died from old age, and the maples have ceased to supply us with sugar, the race of the corn-planter will have exterminated the race of the flesh-eater, because the hunters determine not to sow."

Sylvester Graham's Diet Reform Movement

The founder of the modern movement for dietetic reform, Sylvester Graham, was converted to the practice of flesh-abstaining in 1830 by Mr. Metcalfe, a clergyman living in Philadelphia, who came to America from England in 1817 with a company of forty-one to found a vegetarian colony. Dr. Wm. Alcott was converted to the movement at the same time. Graham soon became a most active propagandist. He wrote much, published a monthly, *Graham's Journal*, in 1838 and 1839, and lectured widely. In 1839 appeared his lectures on *The Science of Human Life*, an admirable treatise which is still worthy of study. Graham's most important contribution was his treatise on *Bread and Bread-Making*, which advocated the use of whole meal bread and gave rise to the name graham bread, now familiar in every language throughout the civilized world. Graham maintained that the problem of longevity is to be solved by the prolongation of youthfulness. In this he agreed with Hufeland, Flourens, and other physiologists.

Graham's *Lectures* constituted by far the most rational and comprehensive treatise on the science of living that had appeared when it was published. In reply to the argument that the ape readily learns to eat flesh-food, Graham well remarks:

But if this proves that animal to be *omnivorous*, then the horse, cow, sheep, and others are all omnivorous, for everyone of them is easily trained to eat animal food. Horses have frequently been trained to eat animal food, and sheep have been so accustomed to it as to refuse grass. All carnivorous animals can be trained to a vegetable diet, and brought to subsist upon it, with less inconvenience and deterioration than herbivorous or frugivorous animals can be brought to live on animal food. Comparative anatomy proves that man is naturally a frugivorous animal, formed to subsist upon fruits, seeds, and farinaceous vegetables.

The following statement, made by Graham nearly eighty years ago, has never been disputed:

The peasantry of Norway, Sweden, Denmark, Germany, Turkey, Greece, Italy, Switzerland, France, Spain, England, Scotland, Ireland, a considerable portion of Russia and other parts of Europe subsist mainly on non-flesh foods. The peasantry of modern Greece (like those of the days of Pericles) subsist on coarse brown bread and fruits. The peasantry in many parts of Russia live on very coarse bread, with garlic and other vegetables; and like the same class in Greece, Italy, etc., they are obliged to be extremely frugal even in this kind of food. Yet they are (for the most part)

healthy, vigorous, and active. Many of the inhabitants of Germany live mainly on rye and barley, in the form of coarse bread. The potato is the principal food of the Irish peasantry, and few portions of the human family are more healthy, athletic, and active, when uncorrupted by intoxicating substances (and, it may be added, when under favorable political and social conditions). But alcohol, opium, etc., (equally with bad laws) have extended their blighting influence over the greater portion of the world, and nowhere do these scourges so cruelly afflict the self-devoted race as in the cottages of the poor; and when, by these evils and neglect of sanitation, etc., diseases are generated, sometimes epidemics, we are told that these things arise from their poor, meager, low *vegetable* diet. Wherever the various sorts of intoxicating substances are absent and a decent degree of cleanliness is observed, the vegetable diet is not thus calumniated.

That portion of the peasantry of England and Scotland who subsist on their barley and oatmeal bread, porridge, potatoes, and other vegetables, with temperate, cleanly habits (and surroundings), are able to endure more fatigue and exposure than any other class of people in the same countries. *Three-fourths of the whole human family*, in all periods of time (excepting perhaps, in the primitive wholly predatory ages) have subsisted on non-flesh foods; and when their supplies have been abundant and their habits in other respects correct, they have been well nourished.

INTERESTING FACTS CONCERN- ING THE DIETARY HABITS OF VARIOUS PEOPLES

The sufficiency of the natural diet is well attested by the following facts respecting the dietetic habits and physical characteristics of many different tribes and nations living in widely scattered regions of the world.

South American Bark-Gatherers

The South American bark-gatherers, who collect the bark of the cinchona tree, from which quinine is made, live almost wholly upon bananas and other equally simple vegetable food, and yet are by no means the weak and feeble creatures which the majority of persons who imagine flesh to be a necessary element of human diet would expect them to be. The daily task assigned these hardy mountaineers is to gather and bring to camp 200 pounds of green bark, which they carry upon their backs, threading their way through dense and trackless forests, clambering over huge rocks, climbing steep mountain sides,

crossing deep ravines and dense jungles, and often being obliged to travel many miles in their arduous toil. How many English or American meat-eaters would undertake to carry upon their shoulders all day or for part of a day half as heavy a load as the South American bark-gatherer does?

A friend of the writer, Mr. E. M. Brigham, who has spent several years in traveling through South America, reports that the natives of the eastern slope of the Andes often carry upon their backs a load of 200 pounds for a distance of thirty miles daily, and live for months at a time almost wholly on bananas. The evidence derived from experience and the most extensive observation shows beyond any possibility of question that the notion which prevails in this country that persons who engage in arduous labors must eat largely of flesh meats, or so-called hearty food, which generally means a greasy, indigestible diet, is a gross and indefensible error.

Certain tribes of South American Indians who subsist wholly upon a non-flesh dietary, are remarkable for vigor and endurance. Enock, in his book entitled *Along the Andes*

and Down the Amazon, states that the natives of the great plateau of the Andes subsist almost wholly upon corn and potatoes. Their chief dishes are roast corn and potato soup. These hardy mountaineers are possessed of most extraordinary endurance. An Indian easily travels 100 miles, keeping pace with a good horse, taking along for food only a handful of corn. He sometimes travels two or three days without food or sleep.

Smith, an eminent English author, tells us that the old Peruvians, who were practically vegetarians, were "the hardiest race in the world. In many respects the women were quite equal to the men in muscular power and agility. In 1823 General Valdez led his troops a distance of 750 miles in eleven days, that is, more than 68 miles a day, and at the end met and routed the opposing army. During the march, the soldiers lived on the parched corn which they had in their pockets."

Parched corn is the principal and generally exclusive diet of the Peruvians when engaged in any particular enterprise or effort which requires great activity and power of body.

Charles Darwin wrote, "the most extraordinary workers I ever saw, the laborers in the mines of Chili, live exclusively on vegetable food, including many seeds of leguminous plants."

Non-Flesh-Eating Tribes of Central Africa

The stories told by certain African hunters in numerous popular magazines in recent years give the impression that the principal food of the natives of Africa, at least in the regions where game is plentiful, is the flesh of animals.

This idea is altogether erroneous. There are, to be sure, certain tribes which are quite carnivorous in their habits; but these are few, and, according to the testimony of medical missionaries who have spent many years in Africa and who know the natives well, these flesh-eating tribes are quite inferior, both in character and in physical development, to the non-flesh-eating tribes. It is true that practically all the natives eat meat on occasion, but throughout central Africa the chief sustenance of the native is obtained from the products of the earth, which are most abundant in

this fertile region. Maize, yuma, manioc, coconuts, palm cabbage, bananas, and a great number of fruits and nuts afford ample variety and sufficient nourishment without flesh foods.

Mr. Dugmore, the intrepid traveler, who photographed the wildest and most ferocious beasts at close range, told the writer that the fifty porters who carried his loads through the jungle for months fed almost exclusively upon cornmeal. They ate bananas whenever obtainable, and generally had a little meat once or twice a week, but really did their hard work on maize, sometimes marching for three days, carrying heavy loads, on one day's ration of plain cornmeal.

The *Boston Transcript*, in a recent issue, gives an interesting account of the taming and breeding of the zebra for work purposes in place of the mule, which it excels in strength and in toughness. Attention is called to the vast herds of zebras which are to be found in certain parts of Africa, their preservation being due to the fact that the tribes about them are vegetable feeders, not even taking the trouble to dig pitfalls for animals, as is done

by some other native tribes. These zebras are said to have so little fear that they can be very easily captured, and when taken young may be broken to harness and made to do any sort of work, becoming as docile and tractable as horses of the best breeding.

The sufficiency of a low protein diet is abundantly attested by the tropical millions of low protein feeders who thrive without meat and exhibit every evidence of unusual hardiness and vigor.

According to Mr. Sarvis, the negroes of this section of Africa are, generally speaking, flesh-abstainers. He was particularly struck with the strength and fine muscular development of these tribes.

The Bantu race, who inhabit the great part of Central Africa, are almost entirely vegetarian. At certain parts of the year they live, like the monkey, on herbs and fruits of all kinds. Generally their food consists largely of a kind of millet, which is almost tasteless. It is cultivated in their gardens, and they grind it into a coarse meal in a mortar. Bananas and sweet potatoes also form a very important part of the diet of the African races of the central parts. The Wagandas are very fond of the *matoke*, which they make from bananas. A dish of *matoke* is welcome after a long march, extending over six or eight hours, during the whole of which time no food has been eaten. The coconut is also esteemed, but it only grows in districts bordering on the coast.

The natives also eat vegetables and salads of many kinds. In a few districts cattle are kept for the milk and butter, but the natives do not kill the animals for food.

Among the Kavirondos and the Wagandas, who live near Victoria Nyanza, men are found of such strength and endurance that one could not match them in any other part of the world. The Kavirondos wear no clothing whatever, and they are absolute vegetarians, the banana forming the base of their food. The contrast between them and the Pigmies, who live in the forest bordering on Lake Albert-Edward, is very striking. They are a race of very small people, and when on some occasions they distributed rations of flesh among their Waganda porters, the latter sickened and became weak. These negro porters are absolutely stronger than any others in the world. They can run and walk greater distances with heavier burdens, can offer greater resistance to sickness of any kind. They can carry eighty to 100 pounds on their heads or shoulders for sixty miles per day, and keep it up for many days in succession, in countries where walking is very difficult. Their daily rations all this time consist of rice, beans, and a little fruit. These men need very little rest. At the end of a journey they have a meal, then are ready to dance and sing far into the night, to the surprise of the white men, who are tired out with far less exertion. When ill they recover soon, and surgical operations can be performed on them without anesthetics. They are gay and happy, and it is very rarely that one finds a grumbler among them.

Diet of the South Sea Islanders

Captain Cook, in an account of his voyages, states that when he first visited the New Zealanders, he found them enjoying perfect and

uninterrupted health. He did not see a single person who appeared to have any bodily complaint. If wounds occurred, they healed with surprising quickness. Says Cook, "An additional evidence of the healthiness of the New Zealanders is in the great number of old men found among them. Many of them appeared to be very ancient, yet none of them were decrepit. Although they were not equal to the young in muscular strength, they did not come in the least behind them in regard to cheerfulness and vivacity."

Diet of the North American Aborigines

Even the aborigines of our own country, with all their fondness for the chase, before their intercourse with the Europeans subsisted to a considerable extent on the simple products of the earth. The Plymouth colonists found the North American Indians inhabiting those parts under Massasoit, the father of that American Wallace, King Philip, subsisting on the plainest and simplest forms of food and possessing noble and hardy frames and frank and friendly dispositions, remarkable for bodily symmetry and vigor

and activity, and ability to endure severe and protracted labor and exposure. Ground nuts and acorns and bread made of parched maize or Indian corn were the principal articles which Massasoit, in generous and unsuspecting hospitality, served up for the repast of his first white guests. A writer of those early days of our antiquities informs us that "the Indians made a bread from the meal which they made of parched maize," and that "it was so sweet, so hearty, and so toothsome, that an Indian would travel many days with no other food." And indeed it was no uncommon thing for an Indian, starting on such a journey, to take three or four ears of corn with him as his only food, which he would either eat raw, or stop by the way and make a fire, and parch it as he needed it.

For a considerable time, during the severe war which he maintained in his last struggles for his beloved country, that noble and heroic patriot and martyr to the cause of liberty, King Philip, with his few and faithful followers, "subsisted on ground-nuts and acorns and lily-roots." And when Colonel Church captured Annawan, a chief officer under

Philip, he found his wife engaged in pounding parched corn for supper. And, taking advantage of this rude but still lovely sound of domestic charity, he stole like the primal serpent into the sanctuary of peace, to betray and to desolate!

Mr. William Bryant, a respectable merchant of Philadelphia, in the year 1809, went with a company of 120 men, under the United States government, beyond the Rocky Mountains, to conduct to their far western homes the Indian chiefs who were brought to the seat of government by Lewis and Clark. Mr. Bryant states that the company carried their provisions of food, tobacco, and spirits with them, until they had exhausted them in the western wilds, where they were far beyond the reach of any supplies. From that time, during their whole stay of about two years among the Indians, the company subsisted entirely as the Indians did, on the flesh of the wild buffalo and other game, with such esculent fruits and roots as the forest afforded and water. They had no alcoholic nor narcotic substance, nor any other pure stimulant to use; not even salt with their flesh-meat, which

at first they burnt a little to destroy its fresh and natural taste; but they soon learned to relish their flesh-meat very highly without salt, even when slightly cooked. Most of the men belonging to the company were, when they left the United States, more or less disordered in their health and afflicted with chronic ailments. They were all restored to health, and became, like the Indians among whom they dwelt, remarkably robust and active. Their wounds healed in the same manner as stated by Captain Cook of the New Zealanders. One of the company had the fleshy part of his leg torn off by a bear. The Indians stripped some bark from a tree for a bandage, and did up the wound with a little bear's oil, and it healed with astonishing rapidity, apparently without inflammation, and entirely without pain.

Mr. Bryant assures me that so little did the natives regard the pain of cutting or wounding their flesh that it was no uncommon thing for them on any very special and important occasion, to cut off one of their fingers and present it to a friend as a memorial or to any opposite party as a pledge; and he saw sev-

eral individuals with only the thumb and fore-fingers left on one hand.

Diet of the Ladrone Islanders

Before the discovery of the Ladrone Islands by the Spaniards, about the year 1620, the inhabitants supposed themselves the only people in the world; and they were destitute of almost everything that people in civic life think necessary to existence. There were no animals on the islands except birds, and these they did not eat. They had never seen fire, nor could they at first imagine the properties or the use of it. Their food was wholly vegetable, consisting of fruits and roots in a natural state. They were well formed, vigorous, and active, and could carry with ease upon their shoulders a weight of 500 pounds. Disease or sickness of any kind was scarcely known among them, and they generally attained to great age. It was no extraordinary thing for individuals among them to reach a hundred years without experiencing any sickness. Since they have become accustomed to the use of fire in preparing their food, and have deviated considerably from their former

simple and natural manner of living, diseases are much more common among them and they do not average so great an age.

The Diet of the Hindus

The diet of the native East Indians differs in different localities. In Bengal, Burma, Assam, and Madras, as well as in Siam, the native food consists of vegetables, fruits, coconut, pulse, and rice. The Hindus of the Punjab eat no meat at all, although the Mohammedans of the same region eat meat in small quantities. Europeans in the same region eat heartily of meat and in consequence suffer from numerous disorders from which the natives are free. Even the Mohammedans suffer less than Europeans, possibly because they eat less meat and take frequent fasts. According to Simpson, the Europeans should follow the example of the Hindus who, when they came into India from the north, were meat-eaters, but have learned by experience that the use of animal foods is unwholesome. It is reported that Europeans who have been born and reared in the tropics eat less meat than those who have been reared elsewhere.

The argument frequently offered that the Hindus are a feeble and subject people because their diet is deficient in protein is shown to be incorrect by Dr. G. H. Fink, who states in the *Journal of Tropical Medicine* that "if we analyze the various kinds of food used in India by the rich as well as the poor we cannot help coming to the conclusion that, on the whole, the food is fairly well balanced in the matter of the elementary principles of the diet of both Hindus and Mohammedans."

It is true that the East Indians eat very little flesh, the Hindus none at all, and the Mohammedans very little. Nevertheless, according to Dr. Fink, they obtain an ample supply of protein from milk and legumes, so that they cannot suffer in any way from the lack of this important food element. It is evident, then, that some other reason will have to be found for the fact that England has been able to conquer and govern this great body of people.

Sir John Sinclair describes the dispatch messenger of India as having remarkable endurance, often running 1,400 miles in twenty-two days, or at the rate of 62 miles a day.

Their food was boiled rice and ghee with greens.

According to Sir Colin Campbell, Commander-in-Chief of the Indian Army in 1857, "the Rajputs of Rajputana, and the Sikhs of the Punjab, are physically as strong as Europeans, and they are capable of enduring more fatigue, and withstanding better the vicissitudes of the climate of India. This is due partly to race, but chiefly to the nature of their food, of which the staple is wheaten flour, made into chapatis."

Mr. Robert McCarrison, in his excellent work entitled *Studies in Deficiency Disease*, calls special attention to the importance of making a large use of natural and even uncooked foodstuffs instead of increasing the use of meats. We quote as follows:

My own experience provides an example of a race, unsurpassed in perfection of physique and in freedom from disease in general, whose sole food consists to this day of grains, vegetables, and fruits, with a certain amount of milk and butter, and goat's meat only on feast days. I refer to the people of the state of Hunza, situated in the extreme northernmost point of India. So limited is the land available for cultivation that they can keep little live stock other than goats, which browse on the hills; while the food supply is so restricted that the people, as a rule, do not keep dogs. They have, in addition to grains—wheat, barley and maize—an

abundant crop of apricots. These they dry in the sun and use very largely in their food. Amongst these people the span of life is extraordinarily long; and such service as I was able to render them during some seven years spent in their midst was confined chiefly to the treatment of accidental lesions, the removal of senile cataract, plastic operations for granular eyelids, or the treatment of maladies wholly unconnected with food supply. Appendicitis, so common in Europe, was unknown. When the severe nature of the winter in that part of the Himalayas is considered, and the fact that their housing accommodations and conservancy arrangements are of the most primitive, it becomes obvious that the enforced restriction to the unsophisticated foodstuffs of Nature is compatible with long life, continued vigor, and perfect physique.

Absolute Vegetarian Diet of Hindu Monks

The exploration made by the recent Mount Everest Expedition revealed some interesting dietetic facts of which the Chicago packers should take note. The expedition found high up in the Himalayas the monasteries of Thibetan monks who are extremely hardy and live to a great age, at an elevation of more than 16,000 feet, surrounded by perpetual snows, and never taste any flesh in any form. In describing one of these monasteries, an English writer tells us: "Rongbuk Monastery is one of the holiest in Thibet. Animals are not allowed to be killed in all this valley; and all the sheep required for the expedition

were killed, therefore, thirteen or fourteen miles away."

G. Yukawa reports some interesting observations of the Japanese monks, whose diet consists exclusively of vegetable products, rice being the staple, supplemented with soy beans and vegetables. The diet contained an average of 70 grams of protein, 15 grams of fat, 514 grams of carbohydrates, an average energy intake of 2,500 calories. The experimenter concluded that the absolute vegetarian diet of the Buddhist monks of Japan is entirely adequate to maintain perfect health.

On the historic little island of Valamo, in the picturesque Russian lake Ladoga, is found a monastery founded by monks of the Greek Church, A. D. 992, which is visited annually by thousands of pilgrims. These monks are rigid flesh-abstainers and have rigorously maintained the law which they established nearly a thousand years ago, which permits no meat to be eaten on the island.

Diet Customs of Various Nationalities

According to Burchardt, the chief diet of the hardy Bedouins of Syria is wheat bread and camel's milk. Dates are added when available.

Hogarth reports the diet of the people of the Near East to be milk, boiled, curdled or churned; dates, raw or cooked; and olive oil. Meat is used only as a luxury.

The Smyrna porters carry on their shoulders enormous loads, 400 to 800 pounds. In Smyrna the writer saw a porter carrying off with ease a load big enough for a truck. Their diet is dried figs, ripe olives and rye bread.

The Greek sailors are most frugal in their diet. A handful of dry figs with ripe olives and a chunk of black bread makes a whole meal. They are wonderfully active and vigorous. For supper they eat only a little fruit or nothing at all.

The Silesians, Roumanians, and many Oriental people are almost exclusively vegetarians, and enjoy a degree of vigor, vitality, and longevity not found among flesh-eating nations.

The Canary Islanders, whose staple food is *gofio*, parched grain, are hardy and very strong. One laborer is mentioned who lifted and bore to a ship a mass of barilla which four American laborers attempted in vain to lift. This man's diet was coarse vegetables and fruit.

In Algeria, dates are the staple food of the hardy ostrich hunters, whose horses also subsist chiefly on dates of a dry, hard variety. The camels much used in this region are fed on dates almost exclusively.

According to Smith, the people of Jenna, Central Africa, live chiefly on yams and Indian corn [with sour milk] "notwithstanding which, a stronger or more athletic race of people is nowhere to be met with. It requires the united strength of three men to lift a calabash of goods to the shoulders of one. . . . Some of the women bore on their heads loads that would tire a mule."

The Arabs of a large extent of North Africa live chiefly on dates and milk. Their agility, endurance, and health are extraordinary. According to Richardson, who traveled in the Sahara, in some parts not only the peo-

ple, but horses, dogs, asses, camels, sheep, and fowls, live on dates. The date-palm is found in every country from the Tigris to the Atlantic (Russell).

Some years ago (1899) the Emperor of Japan appointed a commission to determine by investigation whether it was necessary to add meat to the national dietary to improve the physique of the race, especially to increase their stature. As regards the use of meat, the commission reported "that the Japanese had always managed to do without it, and that their powers of endurance and their athletic prowess exceeded that of any of the Caucasian races. Japan's diet stands on a foundation of rice." The rice diet of the Japanese is supplemented by the free use of peanuts, soy beans, and greens, which supply all that rice lacks to constitute a wholly sufficient bill of fare.

Thomas Cowen, in his article "The Russo-Japanese War," says: "The Tibetans eat practically nothing but meat, and the meat has not made them a superior race. . . . The Japanese food [meatless], soldier-food, nourishes as well as anything. . . . It makes

muscle, bone, sinew, blood, and life and brain, as the Japanese have proved. There are no hardier soldiers in the world."

The United States Department of Agriculture some years ago reported that the vegetarian Chinaman is able to support himself on one-sixth of one acre of land. Two acres afford ample support for five persons.

According to Dr. Morrison, the Chinese are very strong and have wonderful endurance. "They amble along under loads that a strong Englishman could with difficulty raise from the ground. The common fast-traveling coolies of Sze Chuan carry 100 pounds forty miles a day over difficult country. Some carry 170 pounds. Richthofen states that coolies carry weights of 432 pounds over mountain passes 7,000 feet high."

Dr. W. E. Geil, the famous traveler, recently (1922) informed the writer that the strongest porters he had ever seen were flesh-abstainers. On one occasion, in Western China, in a very mountainous country, he found it necessary to exchange his donkey carriers for men. He called upon the chief of a village to supply him with porters. The

chief shortly appeared with a dozen burly men each of whom took upon his shoulders two donkey loads, which they transported safely over the most difficult mountain passes for a week and at a surprising rate of speed. These men lived upon the most frugal fare and had never in their lives tasted meat of any sort, it being tabooed by their religion.

The hardy natives of Iceland live largely on *skyr*, a curdled milk which they store in barrels for winter use. The same diet is used in Norway and other parts of Scandinavia.

One hundred years ago, according to Count Rumford, the Bavarian wood chopper, one of the hardest of woodsmen, received a weekly ration of "one large loaf of rye bread and a small quantity of roasted meal. Of the last he makes a soup with salt, and with it eats his rye bread. Water is his only drink. He works harder and has a better digestion than the average Englishman or American."

An official report shows that the diet of the Swiss peasant includes little or no meat. "In the Schwyz canton, the people have long lived on plant food, without flesh. They are a fine set of independent mountaineers, and from

this canton the freedom of the Swiss was born."

The peasants of northern Italy eat meat twice a year. They are remarkably robust and hardy.

The diet of well-to-do Italian peasants is more varied. A fairly well-to-do peasant has for breakfast (after two or three hours' work) bread, cheese, and vegetables; for dinner, a large dish of polenta, with oil, garlic, and anchovies, or a thick soup, with beans and vegetables, or macaroni. The supper is similar, but lighter.

The hardy Scotch have never been great meat eaters. In the remote districts kail-brose, shredded greens and oatmeal over which hot water is poured, is eaten with or without milk. Oatmeal with butter, salt, and sweet or sour milk was long a favorite diet; so was pease brose.

According to Douglas, writing in 1782, the diet of the Scotch of the East Coast was then oatmeal and milk with vegetables. He says: "Flesh is never seen in the houses of the common farmers, except at a baptism, a wedding, Christmas, or Shrovetide."

The Irish peasant is almost if not quite the full equal of the Scotch in physical development. The noted traveler Malcolm says; "The finest specimens of the human body I ever beheld I saw in Ireland, and they had never tasted flesh food."

—So long ago as 1583, Stubbs wrote (*Anatomy of Abuses*) that most of our forefathers "fed upon graine, corne, roots, pulse, hearbes, weedes, and such other baggage; and yet lived longer than we, were healthfuller than we, of better complexion than we, and much stronger than we in every respect."

One hundred years later, Macauley tells us, "meat was so dear in price that hundreds of thousands of families scarcely knew the taste of it," and half the people of England, then numbering 880,000 families, "ate it not at all or not more often than once a week."

When Johnson in the eighteenth century defined oatmeal as food for horses in England and for men in Scotland and was expostulated with by Lord Elibank, he replied, "And is it not true?" To which his lordship rejoined, "And where do you find such fine horses as in England and such fine men as in Scotland?"

In the fourteenth century, the common people ate little besides bread, butter, cheese, and vegetables. It is interesting to note that the English names of meats are of Norman origin, while the names of vegetables are all Saxon. The leek appears to have been the principal vegetable among the Anglo-Saxons. Garden cresses and other herbs were in use. The chief fruit was the apple. Nuts and plums were grown, and the small kernels of the pine were very extensively used. Cherries were very popular in the Middle Ages.

Colonel McCarrison, an eminent English surgeon and a very acute observer, after spending nine years in the Himalays, where he had a very extensive practice, performing more than 400 major operations yearly, reports that among the many thousands of cases which came under his observation, he never saw a single case of appendicitis, colitis, duodenal or gastric ulcer, or cancer of the stomach or colon. The immunity which these mountain people of northern India enjoy from the diseases mentioned is not unique. It is very commonly found among primitive people who adhere to a simple or biologic diet. In all

cases in which meat is freely used, appendicitis and cancer of the colon are prominent in the mortality tables. But these diseases are practically unknown among people who use little or no meat.

Diet and Strength

It is notable that among people who exhibit extraordinary strength and endurance there are very few flesh-eaters. The accompanying list of thirty-nine examples of this sort, chiefly compiled by Russell, includes only three in which great strength was associated with flesh-eating, or less than 8 per cent; and only fourteen examples in which meat was used even occasionally, or one-third of the entire number, leaving 25 whose great strength and endurance are associated with a fleshless diet.

EUROPE:

DALECARLIAN SWedes

Grain, milk, cheese, etc.; probably fish also

LAPLANDERS (SOME)

Flesh, blood, barley, coffee, alcohol

FINNS (SOME)

Rye, barley, potatoes, fruit

RUSSIAN GRENADIERS

Eight lb. black bread, 4 lb. oil, 1 lb. salt; for eight days

RUSSIAN LABORERS AT A PORT

Rye bread, garlics, etc.

ASIA

SIBERIAN SOLDIERS

Rye bread, soup

GREEK BOATMEN

Black rye or wheat bread, raisins or figs, etc.

TURKISH SOLDIERS

Bread, mutton, beans, rice, butter, salt

PART OF OTTOMAN ARMY

Vegetarian generally, water drinkers

BOATMEN, ETC., AT CONSTANTINOPLE

Bread, cucumbers, cherries, figs, dates, or other fruit, a little fish

PORTERS AT SMYRNA

Vegetables, grain, or fruit

KOLASHIN (MONTENEGRO)

Maize, milk, oil, onions, mutton

MONKS OF CYPRUS

Beans and barley bread; flesh rarely

CHINESE LABORERS (COUNTRY)

Rice, vegetables; sometimes a little fish or flesh: in some parts, rice, millet, sweet potatoes, beans, etc.

KOREAN COUNTRYMEN (SOME)

Rice, eggs, dried fish, flesh; or rice, beans, spice, vinegar, radishes; occasional flesh

JAPANESE SOLDIERS

Rice, 36 oz. vegetables, some fish; barley and beans at times

SAMURAI

Unhulled rice chiefly, some fish or eggs, dried fruit, tea; cool, not cold, water

TATARS OF THE CHIN HILLS

Flesh, alcohol, etc.

MADRAS MESSENGERS

Boiled rice, etc.

HIMALAYANS

Rice, etc.

SIKHS

Vegetarian chiefly, wheat flour

ARMENIAN PORTERS

Bread, olives, cheese, onions, salad

AFRICA

JENNA PEOPLE (CENTRAL AFRICA)

Chiefly yams and maize

ARAB TRIBES IN NORTH AFRICA

Dates, milk, etc.

CONGO SLAVES (RIO)

Vegetarian

CANARY ISLANDS LABORERS

Coarse vegetables, fruit, grain

SOME NATIVE RACES OF SOUTH AFRICA

Millet, sour milk, etc.

AMERICAS:

TOBASCO INDIANS (MEXICO)

Maize, sugar, etc.

MEXICAN INDIANS AND MINERS

Maize, sugar, omelets, vegetables

CHILIAN LABORERS (FROM DARWIN)

Two small loaves, 16 figs, boiled beans, roasted wheat

YAQUIL MINERS (FROM DARWIN)

Boiled beans and bread

RIO SALADO SPANIARDS

Vegetarian

BOLIVIAN TROOPERS

Maize, cocoa, water

BRAZIL SLAVES

Rice, fruit, bread, roots

OPON INDIANS

Maize, sugar-cane, game, bananas, bread-fruit, mangoes, oranges

FRIENDLY ISLANDERS

Bread-fruit, potatoes, taro, fruit, fish

IPALAOS ISLANDERS

Bread-fruit, vegetables, fish, yams, potatoes, taro, bananas, coconuts, birds, eggs, turtles, etc.

COMANCHES (RED INDIANS)

Animal chiefly; buffalo, piñon-nut, etc.

OSAGES (RED INDIANS)

Buffalo, maize, beans, pumpkins, wild plums

THE MARVELOUS ADAPTATION OF THE NATURAL DIET TO HUMAN NEEDS

Nothing is more dangerous than to adopt and undertake to follow implicitly a theory in diet, and nothing is safer in matters dietetic than implicit obedience to the teaching of Nature. It is well always to remember that Nature is marvelously wise. Indeed, nothing else should be expected, since Nature is nothing but an expression of the infinite wisdom embodied in the cosmos of created things.

A brief glance at the special adaptations to human needs of the several classes of food-stuffs which enter into the natural diet of man will be found both interesting and instructive. Recalling that the natural human dietary consists of fruits, nuts, grains, succulent roots, tender shoots, milk, and eggs, let us note how admirably each one of these meets certain definite bodily requirements, and how the properties of each one supplement or complement those of the others.

Fruits

Fruits in general may be regarded chiefly as a source of carbohydrates, and the proportion of protein is also very low. Notable exceptions are the olive and the avocado or alligator pear, which contain almost no carbohydrate. Only in such dried fruits as dates, figs, prunes, and raisins, aside from that wonderful tropical fruit, the avocado, is the proportion of protein large enough to be worthy of consideration as a source of protein to meet the bodily needs. The small amount of protein present, however, is of notably fine quality; at least, this is known to be true of the protein of apples and is probably equally true of that of other fruits. Since the human dietary consists chiefly of carbohydrates, it is evident that fruits are admirably adapted to be a large factor in human nutrition.

In addition to carbohydrates, fruits are a most important source of vitamins. The essential water-soluble *B*, the most important of all the vitamins, is always present in the juices of fresh fruits and in large proportion in most fruits. The antiscorbutic vitamin (water-soluble *C*) is likewise found in fresh fruits

in abundance. In that most interesting garden fruit, the tomato, all the vitamins are found in good proportions. The tomato is, in fact, so valuable a source of vitamins that this cheap and palatable vegetable fruit should enter very largely into the dietary at all seasons of the year. Fortunately, the process of canning does not seriously impair any of the fine qualities of the tomato, which retains even the antiscorbutic vitamin, destroyed in the process of canning most other foodstuffs. The juices of the orange, the lemon, and other citrus fruits are also a most valuable source of vitamins and have been the means of saving many thousands of infant lives. Orange juice or tomato juice should be systematically used in the feeding of infants when pasteurized or sterilized milk or cereal foods is depended upon as the chief source of nutriment. Thousands of bottle-fed babies have been killed or stunted and crippled for life by neglect of this precaution.

The appetizing qualities of fruits, which are nearly always acceptable even when other foods are not relished, make them most useful accessories even when other foods may

constitute the bulk of the bill of fare. Another fact worthy of note is that certain fruits are highly valuable as sources of food iron. This is especially true of dried fruits, as dates, figs, and raisins. The acids of fruits are valuable not only as carbohydrate foods but as aids to digestion and vital stimulants. They possess some value as germicides and by stimulating peristalsis aid in maintaining the normal intestinal rhythm.

Many fruits, such as apples, peaches, apricots, and especially berries of all sorts, are highly useful as a source of roughage. They supply more cellulose in proportion to the amount of nutriment which they furnish than does any other class of foodstuffs except green vegetables.

Nuts

Botanically nuts are classified as fruits, but they differ so greatly from the products known in the market as fruits that they are properly considered in a class by themselves. Nuts are admirably adapted to supplement or complement fruits in the bill of fare for the reason that with few exceptions they consist chiefly of protein and fats. Many nuts furnish half

their weight of a fat which is of the finest quality and easily digestible. Nut fats are notably more readily digestible than most animal fats, are much less likely to undergo decomposition in the alimentary tract, and hence are much better adapted for human food.

Modern chemical researches have shown that all proteins are not alike. There is indeed an almost infinite variety, every plant producing its own peculiar protein. Animal proteins are, of course, capable of supplying all the elements needed for tissue building, and the proteins of milk possess this quality in the very highest degree. But most of the proteins of plants are incomplete, that is, lacking in some of the subtle elements needed for tissue building. Special researches, however, have shown that the proteins of nuts, at least of all the many different kinds of nut that have been examined, are of the same fine quality as the proteins of milk. They so closely resemble the proteins of milk chemically that some of them were long known to chemists as vegetable caseins. In the face of this important fact it is clear that nut-eaters can have no need for the proteins of meat, since in nuts

they are supplied with protein of the finest quality, wholly free from the excrementitious matters and other objectionable features which accompany meats of all sorts.

The protein of nuts has by recent researches conducted by Osborne, Cajori, and numerous other investigators been proven to be of the very finest quality; that is, it is complete protein and so capable of supplying the sort of material needed for the growth or repair of muscles, nerves, glands, and other of the living tissues which constitute the machinery of the body. The same is held to be true of the protein of oily seeds other than nuts.

Many nuts are also valuable sources of iron and food lime; certain nuts, as the almond and filbert, for example, supply a larger proportion of iron than is found in an equal weight of ordinary beefsteak and several times the amount of food lime supplied by meats of any sort. A diet of fruits and nuts, then, may easily furnish everything which the body requires for perfect sustenance.

Cereals

Under this head should be included not only the seeds of grass-like plants but seeds of all sorts which may serve as human sustenance. Seeds are for the most part sources of carbohydrate. Cereals are very rich in this element and also provide an abundant proportion of protein; more, in fact, than the body requires in proportion to the amount of carbohydrate which they furnish; but unfortunately it is not of the very highest quality; that is, cereal proteins are not complete proteins. For this reason life cannot be well sustained on a diet in which the only source of protein is cereals. On the other hand, nuts, which are very rich in protein of the highest quality, furnish along with it such an excess of fat that the cereal becomes a highly valuable foodstuff well adapted to serve with fruits and nuts in balancing the bill of fare. Human experience demonstrated the value of the cereals ages ago and has made them the staff of life the whole world over. The ease and quickness with which large food crops can be produced by the planting of cereals have given to this class of foods a great rôle in the

development of civilization, and have made the culture of the various cereals, particularly rice, wheat, corn, oats, barley, and rye, the very backbone of agriculture the world over.

Cereals in their natural state furnish a considerable amount of the water-soluble *B* vitamin, which is associated with the envelop or bran. The bran of cereals is likewise needed as a source of roughage. Unfortunately, however, most cereals are supplied to consumers in a denatured and damaged state. The discovery of the process of bolting was of no advantage to the world. Indeed, it was a misfortune. The making of polished rice and the preparation of fine flour bread have been responsible for the premature death of millions of human beings and have made the lives of many millions more miserable and inefficient.

Whole grain preparations of all sorts are rich in iron, most cereals supplying as much iron as an equal amount of ordinary beef-steak. The incomplete protein of cereals, supplemented by the super-protein of nuts, forms a mixture of proteins which supply everything required for tissue building; in other

words, while cereal proteins are incomplete the mixed proteins are complete.

It is true that the cereals require cooking to render them easily digestible as foodstuffs, but recent studies have shown that raw cereal starch is by no means indigestible. Langworthy has demonstrated that several ounces of raw starch, wheat, corn, or oatmeal, mixed with other foodstuffs may be completely digested and without giving rise to any inconvenience. The starch of root vegetables such as the potato is much less readily digested when raw. It is quite possible that the raw starch found in small quantities in certain nuts and in a few fruits, and to a large extent the starch of cereals eaten without cooking, serves a useful purpose by supplying to the colon the small quantities of carbohydrate needed to encourage the development of acid-forming micro-organisms, thus preventing the putrefactive changes which give rise to autointoxication.

Vegetables

In this class of foodstuffs are generally included all kinds of food plants not classed as fruits, nuts, or grains. The majority of vege-

tables have a low nutritive value. As a class, vegetables contain much cellulose, almost no fat, and very little protein. They are chiefly useful for the carbohydrates which some of them furnish, and especially for their alkaline salts, food lime, food iron, and the water-soluble vitamins. The Irish potato and the sweet potato are the chief starchy vegetables. The carrot contains a small amount of starch and some sugar. The beet is rich in sugar. The turnip contains only a small amount of carbohydrate. Those vegetable products known as greens are of the highest value as a source of vitamins, all three of which they present in abundance. They are also rich in food lime and iron. An ounce of spinach, fresh or as served, contains much more iron than is found in the same amount of ordinary beefsteak. Green leaves and tender shoots must be regarded as a very necessary part of the human bill-of-fare. All primitive people make large use of greens. The chimpanzee, the gorilla, and other of the big apes are likewise large consumers of this class of foods. The Chinese use greens freely, as do the people of India and other rice eaters.

The iron furnished by the green leaf is of much finer quality than that furnished by red meats and is better adapted to the uses of the body. The iron of meats is in the form of hemoglobin, the coloring matter of the blood which the meat contains. This form of iron is identical with the waste or excrementitious iron which the body eliminates through the intestine. It is obviously less readily available for use by the body than is the food iron in vegetable foodstuffs in the form of hematogen; that is, food iron ready for immediate absorption and assimilation. It is from the iron associated with the chlorophyl of the green grass that the ox produces its rich store of red blood; and from a similar source, the green coloring matter of plants, the human body derives its choicest blood-building materials.

McCollum and others have shown that, if the vegetable kingdom is depended upon as the exclusive source of food by human beings, all parts of the plant must be made use of; that is, not simply the seeds and fruits and roots but the leaves as well. All parts of the plant are needed to supply to the body the

various elements required for tissue growth and repair. Curiously the same is true of animal food. Carnivorous animals eat the entire carcass or portions of every part of the body. The muscles, glands, entrails, and even the bones, at least the smaller or softer bony tissues, enter into the lion's bill-of-fare. This is necessary because the bones contain practically all the lime in an animal's body, less than one per cent of the total lime content of an animal being found in its soft parts. The vitamins, which are produced only by vegetables, are also found almost exclusively in certain parts. It is for this reason that the liver and the kidney are instinctively sought by many animals and eaten when other parts of the animal are left unconsumed. In these glandular structures are stored the indispensable vitamins which the animal obtains from the vegetable kingdom. The Eskimo, when living upon an exclusive meat diet, as he is compelled to do in the winter season, takes great care to eat liberal quantities of the raw frozen liver of the seal. Only in this way is he able to prevent sickness and even death from a deficiency of vitamins in spite of the enormous

quantities of fat and lean flesh which he consumes.

The experiments of McCollum and numerous others have in recent years demonstrated the entire feasibility of living exclusively upon a diet of purely vegetable origin. It is only necessary to make such a selection of food-stuffs as will supply the body with all the elements necessary for complete nutrition; and this may be easily done, as has already been indicated. It has also been shown that two widely used legumes, the soy bean and the peanut, as well as nuts, supply complete proteins and may be used in supplementing the incomplete proteins of cereals and vegetables. This fact explains the great rôle played by the soy bean in the bills of fare of the Orientals.

Milk and Dairy Products

As has been said above, the human bill of fare may be made up exclusively from the vegetable kingdom. It is even possible for human beings to subsist and to maintain the highest degree of strength and vigor upon a diet consisting of uncooked vegetable products, if sufficient care is taken in making up

the bill of fare. But it cannot be denied that cow's milk fills a most important place in the human dietary. This is especially true of the present time. The modern bill of fare is so thoroughly denatured and rendered so deficient by artificial processes of preparation that cow's milk and dairy products play a most important part in amending or supplementing a dietary which in many cases would not be otherwise capable of supporting human life.

The great value of milk depends chiefly upon three conspicuous qualities:

1. It supplies the finest quality of complete protein, a super-protein which by supplementing the incomplete proteins of cereals and vegetables gives them the value of complete proteins, thus rendering the use of meat not only unnecessary but wholly superfluous and harmful excess when milk and dairy products are used even in very moderate quantity. One tumblerful of milk a day is quite sufficient to entirely make good any deficiency likely to arise because of the incompleteness of the proteins provided by an ordinary bill of fare comprised of fruits, grains, and vegetables, but excluding meat.

2. Milk is perhaps equally important as a source of food lime. One ounce of milk supplies more food lime than a pound of beef-steak. Twenty ounces of milk will furnish a full day's ration of food lime. The addition of one or two glassfuls of milk to the ordinary bill of fare will thus insure a proper intake of lime even though some others of the foods eaten may be quite lacking in this important element.

3. Milk is also an exceedingly valuable source of vitamins. The fat of milk supplies the fat-soluble *A* which prevents rickets. Fresh milk, which has not been sterilized or pasteurized, supplies the water-soluble *C* vitamin which is essential to prevent scurvy. The water-soluble *B* is also found in milk, though rather in insufficient quantity, especially in the winter season, when dairy cows often do not receive enough greenstuffs. Unfortunately, the milk supply of the country is in general so unclean it is unsafe to use it as food without pasteurization; and even pasteurization does not render it entirely safe, because this process does not destroy the spores of the pernicious Welch's bacillus and

other putrefactive organisms. Consequently, much of the milk used in our large cities is pasteurized and cannot be relied upon as a complete source of vitamins. A campaign of education with reference to the importance of clean milk is very necessary. It is important to note in passing that milk is lacking in food iron, the one element in which it is seriously deficient. Hence, whenever milk enters largely into the bill of fare special care must be taken to make free use of greens so as to insure an adequate supply of iron for blood building.

Eggs

Eggs, like milk and nuts, may be used as a means of supplementing the incomplete proteins of cereals and vegetables. In this respect, however, eggs are inferior to milk and are in no way superior to nuts. The best part of the egg is the yolk, which is a choice food substance prepared by Nature for the support of the developing chick while it is imprisoned in its shell. The white of the egg becomes the chick itself, developing through embryonic changes into bones, muscles, nerves, feathers, etc. The yolk weighs half as much

as the white but represents twice as much nutriment. It also presents a remarkable assortment of food essentials, while the white is almost pure albumin. The yolk is one-half water, one-third fat, and one-sixth protein. The protein is of the finest quality. The yolk also contains a rich store of vitamins as well as of food lime and iron. Two egg yolks contain, in fact, as much food iron as a good-sized beefsteak and iron of finer quality.

From the above it may be readily seen that with eggs and milk available there can be no conditions under which the use of meat is necessary, for both eggs and milk will supply any nutritive need which meat is capable of satisfying and much more efficiently. It may be added, also, that eggs can be eliminated from the bill of fare without injury provided milk is eaten, and also provided care is taken to make a liberal serving of greens a part of every day's menu, to insure an adequate supply of food iron.

HOW TO DISCARD MEATS COMFORTABLY AND SAFELY

Thousands of persons who have tried the experiment of going without meat have, after a few months' experience, returned to the flesh pots, testifying that they somehow did not feel so well on a fleshless diet. The writer has known many persons who, after becoming weak and debilitated on a non-flesh dietary, have recovered their vigor through resuming the use of flesh. This experience has indeed been a very common one. The number of people who have attempted strict vegetarianism and given it up is many times greater than those who have permanently adopted a non-flesh regimen. The philosophy of vegetarianism is so reasonable, its ideals so enticingly esthetic and harmonious with the finest human instincts, and the scientific argument in its favor is so wholly unanswerable, there is little difficulty in convincing any fair-minded person of its great advantages. But often when the mind is convinced there still remains an instinctive query whether after all

the complete disuse of flesh foods is safe; and when it happens, as is often the case, that the investigator has known of individuals who have made unsuccessful experiments with the vegetarian diet, the doubt is usually a sufficiently large obstacle to prevent any radical change of habits.

It is certainly true that in the path of the individual who discards meat there exist real difficulties and dangers which have led to so many failures in individual experiments with vegetarianism that they have, as a matter of fact, constituted the greatest obstacle to the progress of this phase of diet reform.

It is unfortunately true that until recently lack of scientific knowledge has compelled diet reformers, as well as everybody else, to grope in darkness, learning a little now and then by painful experience, often making miserable failures because uninformed as to what really constitutes the essentials of a complete human dietary. But within recent years, through experiments in animal feeding carried on in various laboratories by eminent men of science, the fundamental principles of human nutrition have been made known, and

it is now easy to understand how and why flesh foods have come to be regarded in certain parts of the world as important food staples, while by many millions of people in other parts of the world very largely or even wholly discarded.

According to modern studies, it is not sufficient that the food should contain an adequate amount of protein, fats, and carbohydrates, but to these food essentials must be added suitable quantities of lime for the bones and other tissues, iron for the blood, and vitamins as vital stimulants and regulators of nutrition.

Another fact of equal importance bearing on this question is the discovery, in very recent times, that proteins differ greatly among themselves and are by no means equivalent; that is, certain proteins, known as complete proteins, when taken into the body in proper quantities may be wholly utilized in tissue building, because they contain exactly the elements needed, no more and no less, for the building of muscles, nerves, glands, and other nitrogenous tissues. On the other hand, there are other proteins which, when taken in the

same quantity, do not afford the body the same amount of nourishment because they are not complete, do not furnish all the elements the body needs for tissue building. These proteins, known as incomplete proteins, are very abundant in vegetable foods. In fact, nearly all vegetable proteins belong to this class, while the proteins of meat, milk and eggs are complete proteins.

The protein of the soy bean, the peanut, the almond, and various other nuts has, however, been shown to be of high quality, practically equal to the protein of flesh. It is to be noted, also, that the proteins of milk or eggs are fully equal to the proteins of meat in quality, and so in this particular meat possesses no exclusive value. When meat is discarded, it is evidently necessary that care be taken to supply in its place an adequate amount of protein derived from the soy bean, the peanut, the almond, or other nuts, or from milk or eggs. Four or five ounces of soy beans, peanuts, or almonds afford an abundance of protein for a day's ration. Half the quantities named will prove sufficient to supplement the proteins of an ordinary varied vegetable diet from which

meat is wholly excluded. A pint of milk will equally well serve to supplement an ordinary day's ration otherwise consisting exclusively of vegetable foodstuffs.

It is evident, then, that in arranging a bill of fare, either with or without meat, it is most important to know not only whether one has eaten a sufficient amount of food as estimated in calories, but whether all the food essentials are present in suitable proportion. Because of our lack of familiarity with them, it is especially necessary to inquire about vitamins, lime, iron, and complete proteins.

In discarding meats from the bill of fare there is no occasion for concern in relation to lime, as animal flesh is almost wholly lacking in this element. The lime of an animal's body is practically all found in the bones, the soft parts containing less than one per cent of the total lime content. Carnivorous animals eat much of the bones of their victims as well as the soft parts. The cave men ground bones to powder and ate it with the flesh, and the Indians of the Northwest, whom Lewis and Clarke found living on dried fish, consumed

the bones with the flesh after crushing them in their stone or wooden mortars.

In the matter of vitamins, also, the flesh-abstainer need have no concern, for flesh food is very deficient in vitamins. In the animal body the vitamins are, for the most part, concentrated in the liver, and other glands.

It is equally or perhaps more important that the iron content of the food should be considered. One loses each day nearly a quarter of a grain of iron. This minute quantity is important since, if it is not replaced, in three months one may lose half of all the iron in his body, which means a loss of half his blood.

Iron is abundant in meat because of the blood retained in the tissues. This is especially true of red meats. The ordinary mixed feeder derives nearly all his iron from the meat which he eats, although the iron of flesh is not of the finest quality. Having once been used, it is less suited for blood building than the iron furnished by vegetable sources. The iron of meats, is in fact, the same sort of iron which the body excretes through the intestine. It is iron which results from the destruction of red

blood cells and, as has been shown by animal experimentation, is less readily utilized by the body than is the iron of vegetable foodstuffs.

When meat is dropped from a mixed bill of fare, the remaining foodstuffs, such as potatoes, white bread, sugar, coffee, butter, corn flakes, rice flakes, boiled rice, griddle cakes, and the various soups, entrées and desserts which appear on the ordinary breakfast, dinner and supper tables, are almost wholly lacking in iron. So, when the food reformer drops meat and adds nothing to take its place as a source of iron, he begins at once to lose a part of his blood iron, of which he possesses only 45 grains, and his blood likewise begins to deteriorate. Fortunately, the loss of iron is not a necessary consequence of the disuse of meats, for while many vegetables—in fact, the majority of foods in current use in civilized countries—are lacking in iron, there are a few foodstuffs, readily accessible, sufficiently rich in iron easily to take the place of the most ruddy beefsteaks. Greens of all sorts contain an abundant supply of iron. Ounce for ounce, spinach contains more iron than sirloin or tenderloin or roast; and some greens, such as

curly leaved dock and red-root, furnish in one ounce two or three times as much iron as is furnished by the same amount of lean meat. The fat of meat contains, of course, no iron. Certain nuts, as the almond and filbert, and certain fruits, as the date and the fig, are very rich in iron, and iron of the choicest quality, containing as much as does beefsteak. The yolks of eggs contain a fine quality of iron adapted for food, and in larger quantity than is found in meats.

It is evident, then, that we are in no wise dependent on meat for any food essential; and it is equally evident that when the dietary has been so arranged that meat is the sole source of certain food essentials, such as complete proteins and iron, when flesh is discarded from the bill of fare these food essentials must be supplied from other sources. Fortunately, the complete protein can be easily supplied by a glass of milk or buttermilk at each meal. Skimmed milk will answer the purpose perfectly, or cottage cheese or nuts.

To supply the necessary food iron, one who discards meat must take care to make a liberal serving of greens a part of every day's ration.

To make sure of an adequate supply of iron it is better to eat greens at two of the daily meals. It is a good plan to use molasses instead of sugar, for molasses contains a considerable amount of iron, while sugar contains none; and better still is it to substitute dates or figs for cane sugar, for dates and figs present sugar in more wholesome form than that which generally appears upon our tables, and besides supply with the sugar the lime and iron which Nature associates with it.

It thus appears that the scientific discoveries of recent years relating to nutrition have in no way weakened the position of those who discard flesh foods; but on the other hand, fully justify the ground on which food reformers have long stood.

With the aid of the suggestions above made, the writer does not hesitate to say that anyone to whom ordinary foodstuffs are available may discard flesh foods at once and forever, not only without incurring the smallest risk of depreciation of vital stamina and vigor, but with the distinct advantage of adding to his strength and efficiency, to immunity from disease, and length of life and useful activity.

IS THE DISUSE OF MEAT ADVISABLE FROM A PRACTICAL STANDPOINT?

First of all, it is to be noted that meat supplies nothing in the way of nutriment which cannot be readily obtained from other sources which are free from the objections which exist against meat. The one thing which meat supplies to the diet which is of pre-eminent value is a good quality of protein technically known as "complete protein," that is, a protein which supplies all of the amino acids or "building stones" needed for the growth and repair of the living tissues of the body. This element is supplied by the lean portion of meat, not by animal fat. But animal flesh is not the only substance which supplies protein of this sort. Modern studies of the chemistry and nutritive values of foodstuffs have developed the fact that the protein of milk equals that of meat and is even superior to it, and that the proteins of eggs as well as of nuts and of at least two legumes, the peanut and the soy bean, likewise possess the superior qual-

ties needed for tissue-building. The proteins of cereals, fruits and vegetables is also of high value, even if not quite equal to the proteins of meat.

Professor Sherman, of Columbia University, a recognized authority on subjects relating to food and nutrition, has demonstrated by observations upon both animals and human beings, that the addition of four ounces of milk to a bill of fare consisting of cereals and fresh vegetable foodstuffs, will so supplement the vegetable proteins as to fully make good any deficiency which might occur through the disuse of meat.

The average per capita consumption of milk in this country is nearly one pint, from which it would appear that the average citizen would not suffer for lack of protein even if all meats were at once excluded from the bill of fare; or, if there were any danger of a deficiency, it might easily be made good by saving the 4,000,000,000 gallons of skimmed milk every year thrown away or used for other purposes than human food, which would supply nearly another pint of milk, thus insuring an abundance of protein of the highest quality.

It is thus evident that our 25,000,000 cows are able to furnish us with all the animal protein we require; but in addition to this, the twenty billion eggs provided by our hens are another very considerable source of protein of the highest quality.

But even in the absence of milk and eggs, an abundant supply of protein could be readily secured by the planting of peanuts and the soy bean, two remarkable legumes which, pound for pound, supply more nourishment than beef or pork and of finer quality.

And, finally, it is not to be forgotten that in nuts we have a source of protein having the same qualities as meat and milk, and in such concentrated form that by the addition of a third or a fourth of a pint of nuts of almost any sort to the bill of fare, a sufficient amount of protein of the required quality will be insured, even if milk and eggs, as well as meat, are excluded from the bill of fare.

Nuts, together with the peanut and the soy bean, afford a protein which is equivalent to that of meat at a cost far below the cost of meat proteins. For example, an acre of very ordinary ground will produce twenty bushels,

or twelve hundred pounds of soy beans, which contain 40 per cent, or four hundred and eighty pounds of excellent protein. It takes an acre of ground and two years to produce seventy-five pounds of dried protein in the form of beef. The same land will produce in the same length of time nearly one thousand pounds of soy bean protein. In other words, an acre of ground devoted to soy beans will produce more than thirteen times as much protein as the same ground used as a pasture for fattening steers, and if we would plant out in nut trees a few million acres of our billion acres of arable land, we might in so doing insure ourselves against the possibility of any lack of protein for many generations to come. And from the same sources, a sufficient amount of fat may be readily obtained to insure us against any danger from a deficiency of these dietary essentials.

It is thus evident that the disuse of flesh as an article of food is easily practical as well as theoretically necessary. Indeed, the writer has been for many years convinced that the general disuse of flesh foods would prove to be as great a source of increasing the material

wealth of the country as of improving the health of the average citizen. The enormous waste to which attention has been called in the foregoing pages might be stopped at once and without injury or embarrassment to any one. The saving in the cost of living would certainly be very considerable, and this even though the increased consumption of milk should result in a considerable increase in the cost of dairy products. Even certified milk at thirty cents a pound is considerably cheaper as a source of food than is beefsteak at the price of thirty cents a pound, a price considerably below that usually asked for a so-called good quality of beefsteak.

The U. S. Department of Agriculture Shows the Use of Less Meat to Be Safe and Economic

Prof. O. E. Baker of the Department of Agriculture, in a notable paper read before the Association of American Geographers (April, 1922), called attention to the fact that "Fully three-fifths of the crop acreage in the United States, or about 225 million acres, is

used to produce feed for farm animals; and, in addition, our live stock consume the product of about 75 million acres of improved pasture, probably of 150 million acres of unimproved grassland pasture in farms, and about 200 million acres of woodland pasture in farms and in our National forests, besides that of perhaps 500 million acres of arid or semi-arid open range land in the West. It seems safe to say that the live stock consume two-thirds of the product of the improved land and practically all the product of the unimproved pasture, or fully 80 per cent of the total food and feed produced by tame and wild vegetation in the United States."

The professor adds, "The consumption of meat (including lard and poultry) per capita in the United States is now about 170 pounds, whereas in Germany before the war the consumption was about 100 pounds, and in Japan it is only four pounds. The annual per capita consumption of meat in the United States could probably be cut to 50 pounds without injury, if compensated by proportionate increase in use of dairy products and vegetables. Such diet, fully as nutritious as our present

partial meat diet, would enable the nation almost to double its population without diminishing its real welfare."

"Briefly, then, our arable land, present and potential, if fertilized and cultivated like the land of Germany, could provide food and fibers in accordance with our present tastes for about 250 million people, and with a largely vegetarian and dairy diet for from 400 to 500 millions, so long as the supply of fertilizer held out."

Professor Baker is evidently not at all in sympathy with the "Eat-More-Meat" campaign of the Chicago packers since he tells us that the per capita meat consumption may be cut to less than one-third its present figure "without injury." If the average American should cut his meat bill to sixty pounds a year, he would save anywhere from twenty-five to fifty dollars a year, which would mean a total saving to the country in butcher's bills of three to five billion dollars, to say nothing of the saving of loss from disease and death which would probably amount to as much more. This saving alone would pay off the war debt in four or five years, and make us so rich we

could cancel the debts of the allies and not feel it.

It would seem that the U. S. Department of Agriculture speaks with one voice when it talks to the farmers and with quite another when it addresses men of science. Bulletins for farm use may win farmers' votes, but unless backed up by facts will lessen respect for a federal department which by its devotion to the interests of all the people has won a high place in their respect and esteem.

Importance of Planting Nut Trees

In view of the fact that our population is increasing considerably faster than our food supply, it is important that the growing of nut trees should be encouraged. Indeed, in the writer's opinion, nut trees should be planted on a large scale. A row of nut trees on each side of the 2,500,000 miles of highways, would, in the course of a few years, produce at almost no cost an annual crop of nuts which would furnish at least one-half of the protein and fat required for food by a population equal to the present population of the United States.

One pound of walnut meats equals in food value each of the following:

	Pounds
Beef loin, lean	4.00
Beef ribs, lean	6.50
Beef neck, lean	9.50
Veal	5.50
Mutton leg, lean	4.20
Ham, lean	3.00
Fowls	4.00
Chicken, broilers	10.00
Red Bass	25.00
Trout	4.80
Frog's legs	15.00
Oysters	13.50
Lobsters	22.00
Eggs	5.00
Milk	9.50
Evaporated cream	4.00

One acre of mature walnut trees, 40 trees to the acre, will produce every year food equal to any of the following items:

- 20,000 lbs. brook trout
- 5,000 lbs. beef (eight steers)
- 16,000 lbs. chicken, broilers
- 34,000 lbs. lobsters
- 30,000 lbs. oysters
- 2,000 lbs. of mutton (13 sheep)
- 66,000 eggs (5,500 dozen)
- 7,000 qts. milk
- 250,000 frogs.

And when one acre will do so much, think of the product of a million acres!

Ten times the product of all the fisheries of the country.

Half as much as all the poultry of the country.

One-seventh as much as all the beef produced.

More than twice the value of all the sheep.

Half as much as all the pork.

And many millions of acres may be thus utilized in nut culture.

And the walnut is not the only promising nut tree. The hickory, the pecan, the butter-nut, the filbert, the almond and the pinon are all capable of producing equal or greater results.

A single acre of nut trees will produce protein enough to feed four persons a year and fat enough for twice that number of average persons. So 30,000,000 acres of nut trees would more than supply the whole people of the United States with their two most expensive foodstuffs. Cereals and fresh vegetables, our cheapest foods, would be needed for the carbohydrate portion of the dietary. Just

think of it: A little nut orchard 218 miles square supplying enough food to feed one hundred million citizens.

Here is a great storehouse of wealth, a potential food supply which may save the world from any suggestion of hunger for thousands of years to come, if properly utilized.

Every man who cuts down a timber tree should be required to plant a nut tree in its place. A nut tree has a double value. It produces valuable lumber, and yields, while growing, every year a rich harvest of food.

Every highway should be lined with nut trees. Some nut trees will grow on land not suitable for other crops. The nut pine flourishes on the barren peaks of the Rockies. Legislation should provide for highway planting of nut trees. Michigan has done this.

The nut should no longer be considered a table luxury. It should become a staple article of food, and may most profitably replace the pork and meats of various sorts which are inferior foods and are recognized as prolific sources of disease.

Nut growing is certainly destined to become one of the most important of our agri-

cultural industries. Half a century hence the nut crop may far exceed in volume and in value our present animal industry.

If the U. S. Government will secure the planting of ten nut trees for each of its 105,000,000 inhabitants, all the pastures may be converted into corn or wheat fields, and all the packing houses into factories, and the flocks of sheep and herds of swine and cattle may disappear, and yet no one will suffer from protein starvation.

Avoidance of Meat is Necessary to Change the Intestinal Flora

The intestinal flora must be changed. Metchnikoff's great discovery that the intestinal flora, that is, the germs growing in the colon and other parts of the small intestine, has a dominant influence upon health and longevity, supplies the foundation for a new and absolutely unanswerable argument against flesh-eating. Metchnikoff and his associates demonstrated that nature takes great care to protect the human body against the harmful effects of putrefactive processes in the intestine by planting in the intestine of the young infant germs which give rise to fermentation

and which produce harmless acids and thereby prevent the development in the intestine of organisms which produce ptomaines and other highly virulent toxins and foul-smelling and poisonous gases.

So long as the acid-forming germs remain dominant in the intestine, there is no danger of colitis, appendicitis or other intestinal disturbances, and the body grows, develops and carries on its processes of repair in a normal manner; but when the acid-forming organisms are driven out by putrefactive bacteria, through the introduction into the intestine with the food or otherwise of these wild germs, constipation, colitis and other infections appear, growth is arrested, and the foundation for numberless diseases is laid. It is coming to be generally recognized by physicians that the most important thing to be done in most cases of chronic disease, is to change the intestinal flora. This is absolutely essential in cases of sick headache, biliaryness, constipation, colitis and all forms of so-called autointoxication. By methods which have now been perfected, this change may be definitely accomplished and usually within a

short time, but for definite results, it is absolutely necessary that the use of flesh meats of all sorts shall be discontinued, for the reason that every morsel of meat, as already shown, contains countless millions of putrefactive bacteria. This is true of salted or smoked meats as well as of ordinary fresh meats.

Putrefactive bacteria, being for the most part spore-bearing, are not destroyed by ordinary cooking. They require for their destruction 240° F. continued for half an hour or more. It is then evident that in endeavoring to combat disease by changing the intestinal flora, or to maintain a condition of the body which is known to be essential to insure health and long life by the suppression of internal putrefactions, meat must be definitely discarded from the bill of fare. It is evident, indeed, that nothing could be more absurd and irrational than to employ measures for changing the intestinal flora while continuing to re-infect oneself by the use of flesh meats as a regular article of diet. It is, in fact, almost equally irrational to indulge in occasional feasts of flesh-eating, as some who are reluctant to renounce flesh meats are inclined to do,

since each indulgence will re-implant the pernicious putrefactive bacteria in the intestine, thus negativing the previous efforts which have been made to get rid of these parasitic organisms and rendering necessary a new attack upon the enemy.

When one knows that butcher's meat is always swarming with manure germs, it would seem that a natural sense of decency and propriety in eating would be sufficient to deter one from the use of flesh foods except as a temporary resource in the absence of cleaner food.

Vegetable Substitutes for Meat

By the combination of nuts and cereals, a product very closely resembling meat may be prepared. The process for doing this was discovered by the writer many years ago in a series of experiments undertaken for the purpose by the request of Professor Dabney, then assistant professor in the Department of Agriculture. Recognizing that the increase of population would ultimately lead to an increase in the price of foodstuffs and particularly of meats, and possibly a scarcity of

meats, Professor Dabney requested the writer to solve the problem by the production of a vegetable substitute for meat. The result of the experiment undertaken was Protose, a nut-cereal preparation, which to a considerable degree resembles meat in appearance, taste and odor, having a slight fibre like potted meat.

Earlier experiments made by the writer led to the production of peanut butter, which has since developed into a great industry and has increased enormously the size and value of the peanut crop of the South. From a food standpoint, a pound of peanut butter is more than equal to the same amount of pork or meat of any sort.

In Malted Nuts, another product of our experiments, is provided a product resembling Malted Milk, which has been extensively used as a substitute for milk by those unable to tolerate cow's milk.

No doubt the future will develop a large number of vegetable products which will so fully supply the place of various meat products and dishes that all of these unwholesome products may be dropped from the bill of fare

without being missed. As a matter of fact, it is now recognized by the most eminent authorities in dietetics that the flavor of meats is about the only reason or apology which can be offered for their use; and since vegetable extracts are now prepared from certain orders of plants related to mushrooms, which supply the rich osmazome flavors of meats and mushrooms while excluding the uric acid and other objectionable features of meat extracts, it would seem that the last excuse for the use of meats of any sort has disappeared.

The Recent Low Protein Movement in the United States

Although the writer, through his journal "Good Health," and in books, tracts, lectures and other means has been for fifty years carrying on an active campaign against flesh-eating, the movement among scientific men in favor of the low protein diet really began with the classical research of Professor Chittenden, of Yale University, which was started a little more than twenty years ago, at the suggestion and with the financial assistance of Mr. Horace Fletcher. Mr. Fletcher, in his ex-

periments to determine the effects of mastication, had made the discovery that thorough chewing of the food produced a disrelish for flesh foods and reduced the amount of protein required to so low a point that flesh meats could be excluded entirely from the dietary without inconvenience to the appetite and without loss in nutrition. Through the acquaintance of General Wood, at that time the head of the army, he was able to arrange for the assignment of a squad of soldiers to be made the subject of experiments, and persuaded Professor Chittenden, of New Haven, to undertake to conduct the research, to the expense of which he contributed, according to his statement to the writer, about \$3,000. This research, which occupied several months, during which the diet of twenty-six persons was constantly under the most rigorous supervision, demonstrated beyond chance for doubt the sufficiency of a diet providing not more than 1.3 calories of protein per pound of body weight. This would make a daily requirement for a person weighing 120 pounds about 150 calories. This amount of protein is provided by $2\frac{1}{2}$ pints of milk, or by 6

ounces of almonds, 5 ounces of peanuts, 6 ounces porterhouse steak, 6 ounces navy beans, 4 ounces soy beans, 5 ounces lentils, 5 ounces black walnuts.

Professor Chittenden recognized the importance of the results of his researches, and in several published works presented facts and arguments in favor of the low protein diet which were a challenge to the advocates of the high protein regimen and have to this day withstood the criticisms which have been offered. At first, there was much opposition, especially from the adherents of the Atwater school. Dr. F. G. Benedict, of the Carnegie Nutrition Laboratory, was the ablest and most active of the advocates of the high protein regimen, for some years opposing the views of Chittenden quite actively; but after the outbreak of the war, especially after the return of Professor A. E. Taylor from Germany, with his report of the remarkable efficiency of the German workmen on a low protein dietary, even lower than that of Chittenden, Dr. Benedict devised and conducted what was known as "The Springfield Experiment," the results of which fully convinced

him of the sufficiency of the low protein regimen and led him to acknowledge the validity of Chittenden's experiments and the conclusions drawn by him therefrom.

Sherman later conducted an extended research upon animals and human beings in which the effects of a low protein diet were studied in nearly one hundred human subjects. As the result of this research, Professor Sherman reached the conclusion that a protein standard even lower than that established by Chittenden, or one calory per pound of normal body weight, is quite sufficient to satisfy all the requirements of the body.

The Inter-Allied Scientific Food Commission which met in London, Rome and Paris during the World War was without doubt the most authoritative body which ever met to consider the subject of human nutrition. At its Paris meeting the question of a minimum meat ration was discussed by the commission, but it was decided to be unnecessary to fix a minimum meat ration "*in view of the fact that no absolute physiologic need exists for meat, since the proteins of meat can be replaced by other proteins of animal origin,*

such as those contained in milk, cheese and eggs, as well as by proteins of vegetable origin."

The U. S. Department of Agriculture sends out a circular prepared by C. F. Langworthy, Ph.D., and Caroline L. Hunt, A.B., in which we are informed that "It is of course possible to eat meat dishes less frequently (than once a day) or to omit meat from the diet altogether, for it has been determined that all the necessary protein and energy may be obtained from other materials, if one so desires and the diet is so arranged that it remains well balanced."

And yet we are also told that meat constitutes one-sixth of the total food consumed in this country. A large expenditure for an unnecessary foodstuff? We will in time learn to do without it.

Still more recent studies have been made by Newburgh and other physiologists for the purpose of determining the optimum protein ration in the treatment of persons subject to diabetes, a disease in which for many years a very high protein ration has been employed. Most physicians have, in fact, until recently

required their diabetic patients to subsist chiefly upon meat; but recent studies have shown that even in this disease the patients do much better on a ration which provides not more than one calory per pound of body weight.

It is perfectly safe to say that at the present time there cannot be found a single physiologist or medical authority of high standing in this country who is an advocate of the high protein regimen or who would undertake to maintain on scientific grounds the physiologic necessity for the use of flesh foods. Indeed, it is questionable whether such a person could be found in the whole civilized world. The only active advocates of the high protein regimen and the meat diet at the present time are the Chicago packers and the pseudo-scientists in their employ.

One of the most active agencies in the United States at the present time in the promotion of the low protein regimen is the Life Extension Institute of New York City. This organization, which is sponsored by more than sixty of the leading physiologists, physicians and scientists of this country, most all of

whom are members of its Hygiene Reference Board, in its hygienic manual entitled, "How to Live," lays especial emphasis on the importance of the low protein regimen. More than 200,000 copies of this work, which carries with it the endorsement of not only men who stand at the head of medicine, surgery, physiology and hygiene in this country, but also the leading scientists of England, France and Italy, have been published and sold in this country.

The time has indeed arrived in which it may be fairly said that the controversy about the protein ration has ended, and that the protein standard of Chittenden is at the present time recognized throughout the civilized world as sufficient to meet the requirements of the body. This standard is so low that it is difficult, if not practically impossible, to make meat a substantial element in the bill of fare without imposing upon the body an unnecessary and harmful burden. It is clearly recognized that if meat is eaten, it is eaten rather as a luxury, a dietetic indulgence, rather than as a necessity. Meat is no longer regarded by scientific men as a necessary part

of the human dietary, but is placed in the class of non-essentials along with tea and coffee, wines and other dietetic concomitants, indulgence in which, while affording pleasure to those who have acquired a taste for them, must be regarded as involving a certain definite waste through the imposing of an unnecessary burden upon the eliminative organs.

That wide-spread, definite, progress is being made in the direction of more rational or biologic living, is clearly shown by the fact that the annual per capita consumption of meat in the United States has fallen from 225 pounds, in 1902, to 170 pounds in 1922, a drop of more than 24 per cent. The fact that the people of Japan maintain a higher standard of health, vigor and endurance than do the people of this country, and on a diet which includes but four pounds of meat per annum, is a clear enough indication that still further progress may be made with profit, and there can be no doubt that some time in the future flesh foods will cease to be a constituent of the dietary of intelligent and enlightened people.

The Half Century Experience of the Battle Creek Sanitarium with a Flesh-less Diet

In 1876, the writer began the organization of the Battle Creek Sanitarium, a new sort of medical institution, the unique feature of which was the co-ordinated association of all known and tested health-promoting appliances. The purpose of the institution was not only the treatment of the sick, but also the prevention of disease by the promulgation of information respecting the care of the health and right living habits. For ten years previously a small work had been conducted as a water-cure, or health institute, under empirical and quasi-scientific management. From the beginning, the dietary of the institution had excluded flesh foods of all sorts.

After the re-organization under new management, with a broader scope as the Battle Creek Sanitarium, the patronage rapidly increased. In recent years, the average annual number of guests has been about 12,000. The total number of persons received at the institution as guests and patients from the begin-

ning to the present time, 1922, has been more than 300,000. In addition to patients and guests, a large number have been employed as nurses and assistants in various departments. The family of workers is rarely less than 1,500 and sometimes several hundred more. The total number of persons employed from the beginning aggregates more than 50,000. The larger part of these workers take their meals in the helpers' dining-room of the institution, from which meat is excluded as it is from the kitchen and dining-room where patients and other guests of the institution are served. Of the patients who visit the institution a considerable number, totaling many thousands, have definitely renounced the use of flesh foods and adhered to the fleshless diet after returning home.

It is thus apparent that the experience of the Battle Creek Sanitarium has afforded an unusual opportunity for studying the effects of the meatless regimen. After having been associated with this institution for more than fifty years, serving as superintendent and medical director for more than forty-six years, the writer has no reason to hesitate in stating

that he has never seen any ill effects from discarding meats when a properly arranged dietary has been followed, although care has been taken to look out for possible injury from this course. On the other hand, it has been clearly evident that many thousands of persons have been greatly benefited by the elimination of meats from the institution's bill of fare. It is generally recognized by the large corps of physicians of the institution that the antitoxic diet, which has come to be rather widely known as the Battle Creek diet system, is one of our strongest features and the chief factor in the successful treatment of many thousands of patients annually.

The facts which have recently been developed by leading bacteriologists and clinicians in relation to changing the intestinal flora, especially when dealing with the various forms of chronic disease, fully justify the dietetic practices of the institution in the elimination of meats of all sorts. Experience has shown the practical impossibility of combating autointoxication by maintaining a normal intestinal flora without eliminating meats from the dietary.

Many years ago the writer became convinced of the importance of the meatless regimen in the management of surgical cases, especially those of abdominal operation and other major ones. So long ago as 1895 he published a paper reporting the results in a large number of abdominal operations in which special attention was given to intestinal asepsis through the avoidance of meats and meat broths in the dietary and the employment of measures calculated to prevent the accumulation of wastes in the intestine. In a series of 385 major abdominal operations (1889-1895) the total mortality was 2.3 per cent. The above figures include a series of 233 cases of non-septic ovarian cysts with one death, and 165 successive cases of ovarian tumors or diseased appendages with no death. The significance of these figures will be appreciated when it is remembered that at the period named our modern surgical technic had not yet been developed. Rubber gloves were not worn, and the usual mortality rate in abdominal cases was 15 to 20 per cent or more.

The good results obtained in the manage-

ment of both surgical and non-surgical cases at the Battle Creek Sanitarium has attracted the attention of the managers of other hospitals and medical institutions. As the result of a visit to the institution and a very painstaking investigation, the board of trustees of Beth Israel Hospital, of New York City, have recently decided to adopt a similar regimen in the new three million dollar hospital which they have erected. The decision of the management to make this radical change in the dietary of this great hospital was not reached until after seeking the advice of many of the leading physiologists of the country with reference to the wisdom and safety of a step of this sort. A questionnaire was sent to a number of prominent authorities on nutrition and their replies were published a few months ago (1921) in the *Modern Hospital*. Of the numerous answers received, not a single one regarded the change as either unwise or dangerous. In every instance the reply to the committee's inquiry was a clear and complete endorsement of the plan. The following are some of these answers:

Francis G. Benedict, director of the Car-

negie Institution, Nutrition Laboratory, Boston:

My good friends at the Battle Creek Sanitarium would, I am sure, assure you that your project is hygienically and physiologically sound. Looking out for the food accessory substances, I should be quite inclined to feel that your plan was a safe one.

Russel H. Chittenden, Sheffield Scientific School of Yale University:

In reply to your letter of June 9, I beg to state that in my opinion it is quite possible, and indeed a desirable thing, for many reasons, to establish a lacto-vegetarian dietary in the wards of your hospital. There is no question in my mind that such a diet can be made nutritious and healthful.

With vegetables of all kinds, and milk, bread, and butter, you have at your command all the necessary resources for a nutritious diet.

Graham Lusk, Department of Physiology, Cornell University Medical College, New York:

I believe that the lacto-vegetarian diet could be established in any hospital without detriment to the health of the patients. It would be well to provide green vegetables or spinach, so that iron could be taken in this form. Of course, as you know, a milk diet was long the only support of typhoid patients.

E. V. McCollum, the Johns Hopkins University School of Hygiene and Public Health, Baltimore:

I have not the slightest hesitation in saying that a vegetarian diet, supplemented with fairly liberal amounts of milk, is the most satisfactory type of diet that man can take. . . . I feel that you would be entirely safe in adopting this kind of diet and that you would be doing much better by your patients than is now being done in many of the best hospitals in the land, where patients are attempting to recover from wasting diseases or from surgical operations on diets of the cereal, tuber, muscle meat type. Palatable and attractive as they may be, I feel confident that they are not very satisfactory as human foods when adhered to over appreciable periods.

Lafayette B. Mendel, Sheffield Laboratory of Physiological Chemistry, Yale University:

I have given some thought to the advisability of introducing a meatless dietary into your hospital régime, and have reached the conclusion that there will be no objection to this upon physiological grounds. Inasmuch as I myself lived upon a diet devoid of meat, fowl, and fish for nearly a year, for purely experimental purposes, and remained in excellent health and vigor during that period, I have no fears regarding the wholesomeness of such a procedure.

If you have ever visited the Battle Creek Sanitarium, you will have noted that life is possible and good health is maintained without the use of meat.

The Beth Israel Hospital will be supplied with dietitians trained in the School of Home Economics connected with the Battle Creek Sanitarium. It may also be of interest to some of our readers to know that more than fifty of the leading hospitals of the United States

are at the present time being served by dietitians trained at the Battle Creek Sanitarium, and that, by request of army and navy officials, special classes have been formed in the institution for the dietetic training of government nurses, who are sent to the sanitarium for this purpose.

For many years a nutrition laboratory has been maintained in connection with the Battle Creek Sanitarium, in which experiments have been constantly in progress under the supervision of thoroughly trained experts from the world-famous laboratories of some of the leading universities in which special research work of this sort is carried on. The result obtained in this nutrition laboratory, as well as in other laboratories of this kind, confirm and support in the strongest possible manner the principles of biologic living which have from the beginning been made a prominent feature in the work of the sanitarium.

A monthly journal known as *Good Health* has been published for about fifty-six years, and for nearly fifty years under the management of the present writer. From the beginning, this journal has advocated a non-flesh

dietary and the facts set forth in its columns have persuaded many of its readers to discard meat. Thousands of letters have been received from persons who have been benefited by following the biologic diet.

In summing up the results of this extensive practical experience, the writer feels justified in making for the biologic diet, that is, the meatless diet, the claim that it is a rational, scientific, and well-tested regimen, and that it may be adopted not only with perfect safety but with the confident expectation that, if perseveringly and conscientiously adhered to, it will be a source of great and lasting benefit, not only increasing comfort and efficiency, but in a high degree promoting longevity.

NEWSPAPER AND MAGAZINE MISINFORMATION

The average man gets most of his ideas about diet as well as other subjects from the newspapers. People who look to the newspapers for instruction about diet and other matters of hygiene inevitably get into trouble because of the chaotic notions which they encounter; for the newspapers publish anything which they think will amuse or entertain their readers. Yellow journals, numerous nowadays, give preference to things likely to startle their readers. A certain class of papers depends chiefly upon this kind of literature to develop their circulation. Several correspondents have recently sent us the following excellent specimen of this variety of literature, clipped from the editorial page of the *New York Evening Journal* and other journals supplied by the Star Company:

Vegetarianism in a grown person is silly. It is harmful and dangerous in a grown person compelled to use his brain. Tolstoi, Wagner, and all other active minds that have tried it have been compelled to give up vegetarianism.

Nothing but vegetables will do for a man rowing a boat on the Nile—he is often quoted as a healthy vegetarian—or for a guide in the Alps hauling beef-fed Englishmen uphill.

Men that row boats and men that drag tourists uphill only need to develop good muscles and fairly good nerves.

They don't have to use their minds. It may be said of them as the farmer said of his pig: "What difference does it make how long it takes this pig to digest his food?"

But a man who must use his brain at high pressure, and who therefore wants to have his stomach working and using the blood supply for as few hours as possible, needs MEAT, the time-saving device.

To inflict vegetarianism upon a child—except a very young child living largely upon milk—which is meat in another form—is a crime against the child. It should be prevented by law.

When you realize that among the savage nations of the past only those that practiced cannibalism conquered, because they alone gave their children plenty of meat to eat, YOU CAN REALIZE THAT IT IS FOOLISH TO CONDEMN YOUR OWN CHILD TO THE VEGETARIAN SYSTEM, to the sort of life led by the papooses of the clay diggers and other inferior tribes of Indians that didn't have any meat and that were always, therefore, frightened to death when they saw a meat-eating Indian come around.

Don't be a vegetarian. Eat meat once a day at least, not oftener than twice daily."

Such articles do more or less harm, because the average reader does not understand the situation and is in a position to be imposed upon.

The man who produced the foregoing rubbish, not one word of which is true, was not

writing to inform the public. To place useful facts about diet before his readers was no part of his purpose. He was simply earning his salary. He gets \$200 a day (probably more) for scribbling, and has to produce a certain amount of "copy" every day of his life in order to earn his salary. When he runs out of facts he has to keep the stream going, and so he spills the ink on the paper, giving it any shape that his unscrupulous fancy may dictate.

Virchow, the greatest scientist who lived in the last century, said; "The future is with the vegetarians." Every advance step in the science of nutrition made by laboratory research and clinical observation since Virchow's time has confirmed his observation. The newspaper writer referred to above does not offer one single scientific fact in support of his statements, which were evidently "pulled out of his own stomach," as they say in Burma. Let us examine some of these gratuitous assertions.

"Vegetarianism in a grown person is silly." Is it silly for a horse to eat grain and grass? All members of the horse family are grain and

grass eaters; so every horse eats grass when he can get it. Man is a primate. All members of the primate family, that is, the orang-utan, the chimpanzee, the gorilla and other apes, with man, are vegetarians by nature, as shown by the structure of their teeth, digestive organs, their hands, the structure of their muscles, their brains, bones and even their embryological development. Is it silly for man to eat the food which Nature has provided for his class and which is eaten by every member of his class?

Vegetarian animals are longer lived, have greater endurance, greater freedom from disease and greater intelligence than the flesh-eating class, and the same is true of human beings. Is it silly to adhere to a dietary which will insure longer life and greater efficiency?

"A man who must use his brain at high pressure . . . needs meat, the time-saving device." Beaumont showed long ago that meat, on the average, requires two or three times as long for digestion as do fruits and farinaceous foodstuffs such as apples, rice, etc., and his observations have been fully confirmed by modern researches. Boiled rice di-

gests in one hour; roast pork requires five and a half hours.

Professor Cannon, of Harvard, has demonstrated by numberless experiments that farinaceous foods leave the stomach much more quickly than do meats. Fat meats remain in the stomach longer than any other foodstuffs. Professor Zuntz showed that the digestion of meat requires the expenditure of several times as much energy as does the digestion of starch or fat.

The idea that meat is a brain stimulant is based upon the notion that alcohol and tobacco are useful as nerve and brain stimulants. Horsley, the famous English brain surgeon, showed experimentally that the extractives of meat are a paralyzing poison to the brain. After trephining a monkey and locating a motor area on the surface of the brain, he applied gentle electric stimulation. The result was the vigorous contraction of the muscles of the limbs controlled by the particular nerve cells under experiment. He then applied a few drops of bouillon. Instantly, the action of the muscles ceased. No amount of stimulation produced the slightest movement.

The brain cells were paralyzed. Meat is not a true stimulant. It renders the brain, and nerves sluggish. After hearty meat eating, mental dullness is often very pronounced. The meat eater is not only irritable, but stupid and sullen. He is not more active intellectually and has much less endurance, either mental or physical. Seneca, the famous Roman philosopher, noted this, as have many others. He wrote thus (*Epistol.*, 108):—

“I also have given up the use of the flesh of animals and at the end of a year my new habits have become not only easy to me but delicious; and it even seems to me that my intellectual aptitudes have been more and more developed.”

The Catholic Church has for many years enjoined abstinence from meat as an aid to mental and moral clarity.

The extractives of meat are not stimulants, but fatigue poisons, the products of tissue work, wastes that are destined to be removed from the body in order that they may not interfere with the normal working of the vital machinery. Nothing could be farther from the truth than the supposition that these ex-

cretory products can in any way aid or accelerate intellectual activity.

Animals furnish us a good object lesson on this subject. Compare the agility, alertness, curiosity and intelligence of the fruit-eating chimpanzee with the dull stupidity of the lion and the tiger; or the vivacity and progressiveness of the rice- and soy-eating Japanese, with the dull-witted, decaying Eskimo. The canary bird that lives on seeds, has a bigger brain in proportion to the size of its body than has any carnivorous animal. Dog trainers never feed meat to their pupils because it makes them stupid and unteachable.

"To inflict vegetarianism upon a child . . . is a crime against the child. It should be prevented by law." It is impossible to "inflict vegetarianism upon a child." A child is naturally a non-flesh-eater. Who does not know that every infant has to be taught to eat meat? He makes wry faces at first, and only gradually acquires an appetite for the peculiar flavors of cooked meat. If meat-eating were natural to children, they would like raw meat, for cooking is an artificial process; but no child will eat raw meat un-

less forced to do so. If any law is required in this connection, it is a statute to make the publication of such misinformation a criminal offense.

“Among the savage nations of the past only those who practiced cannibalism conquered.” The publication of such a statement as this in the face of the well-known facts of history is brazen effrontery to the intelligence of the average high-school student. Cyrus, one of the greatest conquerors of the ancient world, was a vegetarian. The ancient Romans conquered the world on a diet of wheat.

An “Eat More Meat” Campaign

Mr. Thomas E. Wilson, chief promoter of the packers’ “Eat More Meat” campaign, bewails the decreasing use of meat, showing that between 1900 and 1920 the per capita consumption was reduced 27.2 pounds. Mr. Wilson tells the stockmen of “things which can be done to counteract the declining consumption of meat.” Among other things, he suggests:

The Department of Agriculture might be requested to distribute a booklet prepared from a medicinal viewpoint of

physicians, hospitals, dietitians, live stock leaders, agricultural editors, scientists, and others.

The Bureau of Education might be induced to disseminate to teachers of domestic science in public schools a booklet on the value of meat, together with recipes, and methods of selecting and cooking it wisely.

Federal reserve, national and state banks could do much by pointing out through letters, bulletins, etc., that an increase in meat consumption will increase the purchasing power of farmers.

The packers are certainly trying to "raise the wind" in behalf of their industry, but they will not succeed. When they set to work to find "scientific data wherewith to correct adverse propaganda," they will find nothing to correct. The physiologists have been stating the simple, incontrovertible facts about meat, which show its uselessness and harmfulness, and there is not a word to be said in its favor which has not already been said and resaid so many times during the past that there is nothing new to say. The public health departments and various allied agencies have for several years been urging the people to eat less meat and more milk, and it is not to be believed that these eminent and efficient promoters of national welfare can be persuaded by the packers to back up their "Eat More Meat" campaign, which has been

organized, not in the interest of the public welfare, but simply to enrich the pocketbooks of breeders and butchers.

It is unbelievable that the intelligent teachers of the United States, many of whom have had abundant opportunity to witness the physical improvement in their pupils resulting from a lessened consumption of meat and the larger use of milk, will reverse their teaching merely to please the packers. Neither is it to be believed that the packers possess sufficient influence to line up physicians, hospitals, dietitians, and scientists in defense of their indefensible position.

What right have packers and breeders to undertake to exploit the consumers of food simply to create a market for their products? But if, under the heading "The Truth About Meat," the rural press will publish "appropriate articles," as suggested, that is, articles which really tell "the truth about meat," there will be no likelihood of an increase in its consumption as the result, but rather the reverse. No intelligent person who knows the actual truth about meat and its influence upon the human body will be anxious to hasten the

time when he shall need the services of an undertaker. The breeders, the butchers, the packers, the swine herders and the sausage makers are all shouting in concert, Eat more meat, eat more meat; and begging earnestly, almost tearfully, Dear fellow citizens, we beseech of you, do try hard to eat a little more meat, so as to save us poor packers, butchers, swine herders, and sausage makers from bankruptcy and ruin.

It is preposterous to suppose that intelligent men and women are going to eat more meat, even if their bankers should be persuaded to add postscripts to their letters beseeching their patrons to eat more beefsteak "so as to increase the purchasing power of the farmers." It would be equally sensible to ask the bankers to persuade their patrons to burn more coal, so as to increase the purchasing power of the miners. If the packers are becoming so reduced financially that they feel compelled to call upon their friends, the bankers, to take up a collection in their behalf, let them state their needs openly and frankly, instead of trying to camouflage their alms-asking under the guise of a diet-reform campaign.

When the souls of these tender-hearted millionaires are wrung with anguish and anxiety lest the American people shall suffer and sicken because they are year by year eating less meat, such statements as those made by Benedict, McCollum, Mendel, and other of the well-known authorities we have quoted, must be heart-breaking!

Professor Fisher of Yale Refuses to Support the “Eat-More-Meat” Campaign of the Packers

The Metropolitan Life Insurance Company have discovered that it is profitable business to do something toward prolonging the lives of their policy-holders. A live policy-holder is worth more than a dead one because he pays premiums and allows the company to keep in profitable investments the cash they are to pay to beneficiaries when the policy-holder dies. So the Metropolitan Life Insurance Company asked Professor Fisher to prepare a sort of abbreviated edition of his wonderful book, “How to Live,” for circulation to their millions of policy-holders, under the title, “How to Live Long.” In this ex-

cellent little treatise, Professor Fisher says, "If we eat too much meat and eggs we get more 'protein,' or repair food than the body needs. This makes poisons. Eat little meat and eggs."

Naturally, as soon as the packers discovered this wholesome advice, they complained and asked that the statement should be modified. In other words, they object to the telling of the scientific facts about eating to the people. Their only use for the American stomach is to use it as a dumping ground for the decaying carcasses of the dead calves, pigs and other victims of their gargantuan shambles. Professor Fisher has kindly permitted us to read a portion of his letter in reply to the criticism, which we quote as follows:

November 20, 1922.

"I have yours of November 17 containing copy of your correspondence with Mr.— of the Institute of American Meat Packers.

"If I thought it would promote public health as well as the profits of the packers, I should be only too glad to make modifications in "How to Live Long," corresponding to the

suggestion of Mr. ——. But my further study and experience in this line, particularly in connection with the laboratories at Yale, have led me quite in the other direction. I could quote numerous authorities to offset those collected by Mr. and even those he quotes I would interpret somewhat differently.

"Of course, it is true the liver and kidneys have a large margin of safety but it is also true that this margin is only too often prematurely used up, whether primarily through overwork or through specific local or general infection or partly both, and in those all too frequent cases where the margin is used up or greatly reduced, it is then certainly true that much use of meat and eggs gives these organs undue strain. [Besides, it helps to use up the margin prematurely.]

"If I were re-writing the Section VII, to which Mr. —— makes objection, I would strengthen it rather than weaken it by citing the recent work of Rettger, Cheplin, Newburgh, etc. We now know, quite aside from the question of whether the liver and kidneys have the necessary margin to suc-

cessfully dispose of the poison produced by eating protein, particularly meat protein, that the poison so produced by bacterial action must first circulate through the system, increasing fatigue, diminishing endurance, producing malaise in the brain and injuring the blood vessels.

"The greatest step forward in personal hygiene in recent years centers around the work of Professor Rettger, the aim of which is to reduce putrefaction in the colon. The liberal use of protein, particularly meat, is directly opposed to this and one cannot very consistently approve of the use of acidophilus bacilli, etc., to disinfect the colon while at the same time we are re-infecting all the time by meat."

The effort to convince the American people that they must return to the exaggerated flesh-eating habits of former years is about as likely to prove successful as would be a campaign in favor of the log houses and sod huts which sheltered the sturdy pioneers of a hundred years ago.

The days of the great packing industry are numbered. The slaughter of animals will go on for a long time yet; but every year more

people are seeing the light, and the rising tide of diet reform will continue to sweep on in spite of the pernicious teaching of the false prophets of Packingtown.

Pernicious Piffle

Among popular writers in this country, Dr. Woods Hutchinson has been very conspicuous as a protagonist of flesh-eating. While the doctor has written some excellent articles, especially with reference to the mischief done by the common housefly, he has somehow or other gotten on the wrong track in the matter of diet, and persistently serves up to his readers statements which, in the light of the modern scientific research conducted in nutrition laboratories by McCollum, Mendel, Osborne, Hopkins, and numerous other investigators, are really no better than *piffle*. Unfortunately, if taken seriously, they are likely to do not a little harm.

In a recent magazine (*Collier's*, June 3, 1922) there appears an article entitled, "Why Do We Eat?" which is thus summarized in bold lines, either by the doctor himself or his publisher:

Food fads are exploded and ancient prejudices cast down in this extraordinary article. . . .

Meat is essential. It does no harm and much good. About this meat question, Dr. Hutchinson writes us: "Hundreds of careful laboratory tests have been made, both upon animals and men, and only once has it been found possible to produce any inflammation or disease of the kidneys by the hugest feedings of meat for days and weeks at a stretch."

Dr. Hutchinson is evidently a carnivore. No normal primate ever showed such avidity for flesh as he does. In the face of the plainest evidence to the contrary, he continually insists that meat must be freely eaten by men, women, and children, even babies, to whom he recommends meat juice and broths. He does admit that once, at least, disease of the kidneys has been produced by the feeding of meat. But the doctor is scandalously in error in saying that "only once has it been found possible to produce any inflammation or disease of the kidneys by the hugest feeding of meat for days and weeks at a stretch." Where on earth has he been hibernating all these recent years? Has he never heard of the experiments conducted by Prof. Newburgh, at the University of Michigan, in which Bright's disease, or nephritis, was *invariably* produced within a few months by feeding animals on a high protein diet?

The doctor seems also to have overlooked the interesting observations of Dr. Herbert Fox, director of the Laboratory of Comparative Pathology of the Philadelphia Zoological Garden, who found that hardening of the arteries, or arteriosclerosis, is frequent in meat-eating dogs; whereas it is so rare in a non-flesh-eating animal like the horse that it is doubtful whether it ever occurs in this animal, even though the horse often attains very great age. Up-to-date doctors prohibit the use of meat whenever they find their patients suffering from arteriosclerosis. Of course, the doctors do not expect that withdrawing meat from their patients' diet will cure them of arteriosclerosis, but they know that it will postpone the funeral for a time.

In the face of these facts, is it not very strange that Dr. Hutchinson should have the presumption to tell his readers that,—“all the silly old prejudices against meat, that it ‘heated the blood’ (whatever that means), produced uric acid in excess, hardened the arteries, inflamed the kidneys, caused rheumatism, etc., have now been proved to be pure fairy tales, utterly without foundation in

scientific fact"? Dr. Hutchinson ought to get rid of his "silly old prejudices" in favor of meat, instead of laboring so hard to maintain the popular confidence in meat as a dietary essential, in view of the universal acknowledgment by scientific experts that this popular notion has no scientific basis.

And here is another delicious bit of nonsense which Dr. Hutchinson serves up, evidently for the delectation of the Packers' Institute of Chicago, for the promotion of the "Eat More Meat" campaign:

The very worst cases on record in all medical history of hardening and turning to lime (calcification) of the arteries all over the body, and in the kidneys and intestines particularly, have been found in Trappist and certain orders of Oriental monks, who live almost exclusively upon starch and pulses—that is, peas, beans, and lentils—and abstain from meat entirely.

Their bodies are so full of lime that they are like walking coral reefs for months before their death. The process even extends to the "watch glass" (cornea) of the eye, so that it turns white and milky and makes them nearly blind.

What a fine piece of dramatic writing! One can see those poor Trappist monks staggering along, loaded down with great masses of limestone rock which they have swallowed in the shape of bread. But Dr. Hutchinson

neglects to tell his readers that these Trappist monks are very old men, none of them under seventy, and many of them eighty or ninety years of age. Their arteries are hard, not because they have eaten too much bread or beans or because they have not eaten meat, but because they are so very old. Very few people eighty or ninety years of age can be found without hard arteries. That bread eating is not a cause of hardening of the arteries is well shown by the fact that Dr. Harvey found no hardening of the arteries in Old Parr, of whose body he made a careful examination after death at the reputed age of one hundred fifty-two years and nine months; for Old Parr lived largely on black bread, buttermilk, and greens, foods which are richest in lime, and rarely ate meat.

We are willing to wager that by the time Dr. Woods Hutchinson reaches the age of a Trappist monk, he will be lugging around bigger "coral reefs" than any monk, Occidental or Oriental, ever carried.

It is not known that persons living in hard water districts are more subject to hardening of the arteries than those who live where the

water supply is soft. Hardening of the arteries is not due to the eating of lime. It is a defensive process set up by the body in an effort to protect itself against poisons circulating in the blood, one of the most prolific sources of which is to be found in meat-eating and putrefaction of the undigested residues of meat in the colon.

As a matter of fact, bread as eaten by the American people is very deficient in lime; and, as Sherman has pointed out, the American people are not suffering from eating too much lime but from a deficiency of lime. We need all the lime we can get in beans, peas, and especially in greenstuffs, such as spinach, chard, dandelions, lettuce, etc., to make good the lime deficiency of our bread stuffs and most other of the foods in common use. Dr. Hutchinson must make a new study of the chemistry of cereals.

Says Dr. Hutchinson, "It is quite true that meat leaves in our blood a considerable amount of waste substance called urea, but it is a perfectly harmless, non-poisonous product."

Such teaching as the above is not simply

erroneous; it is pernicious. In the light of modern knowledge, it can hardly be looked upon as less than criminal for a person who has the public ear to pour into it such absolutely false and misleading statements. No physiologist of standing would dare to make such a statement. We are glad to believe that no conscientious physiologist would wish to make a statement so far removed from the facts. Dr. Hutchinson, not being a physiologist, has no reputation to maintain; and, like other public entertainers, he tells the people what he thinks they would like to hear. Of course, such statements will tickle the packers, and possibly the packers will reciprocate; or, more likely, they have reciprocated already. (The packers very quickly reciprocated by the wide circulation of a tract prepared from Dr. Hutchinson's article, bearing the copyright of his publishers.)

Dr. Hutchinson's style of writing is so entertaining and plausible that his articles are likely to do a good deal of harm when, as is so often the case, they inculcate grave errors.

We would cordially recommend to the doctor a careful perusal of Sherman's *Chemistry of Food and Nutrition* and McCollum's *The Newer Knowledge of Nutrition*.

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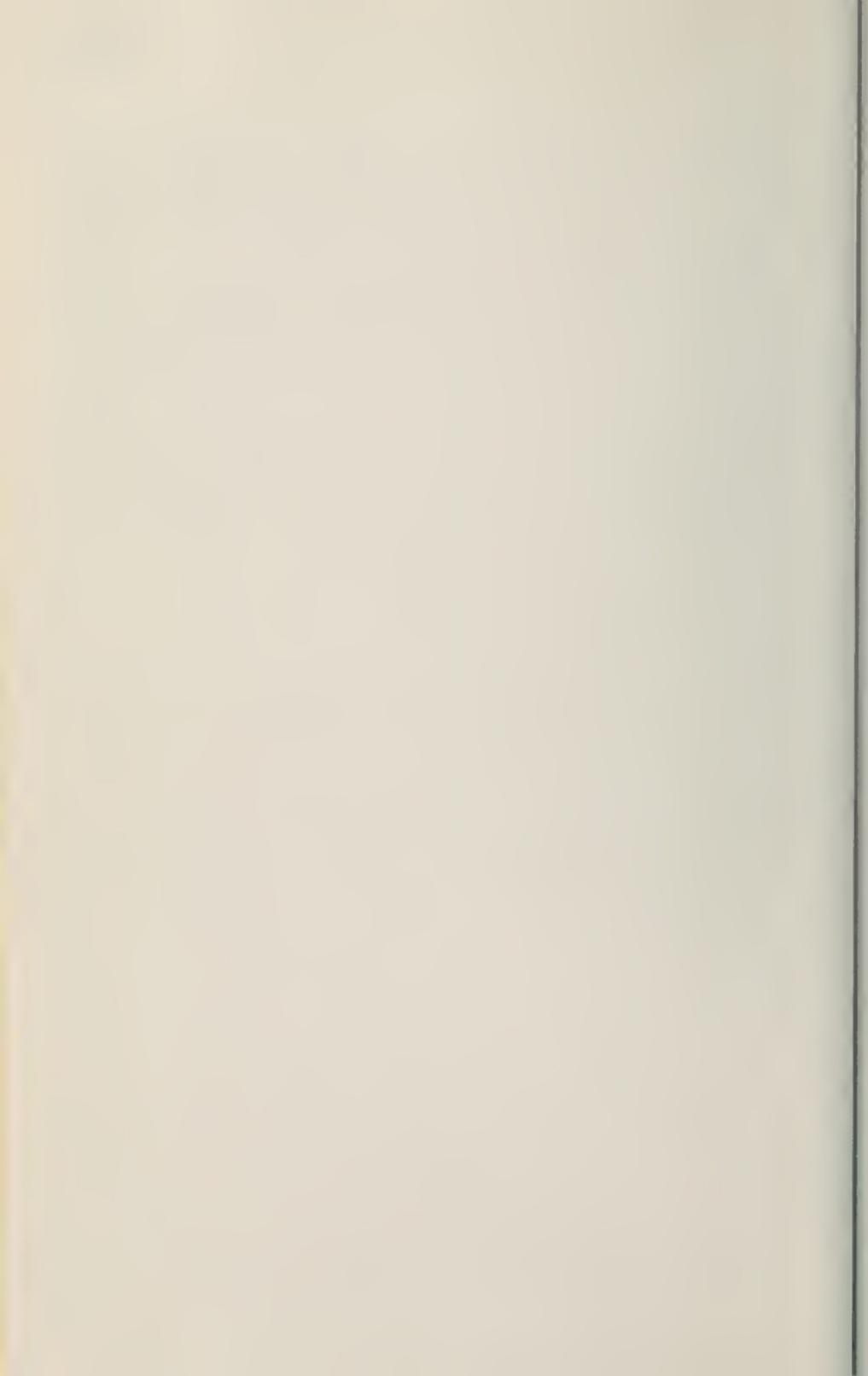
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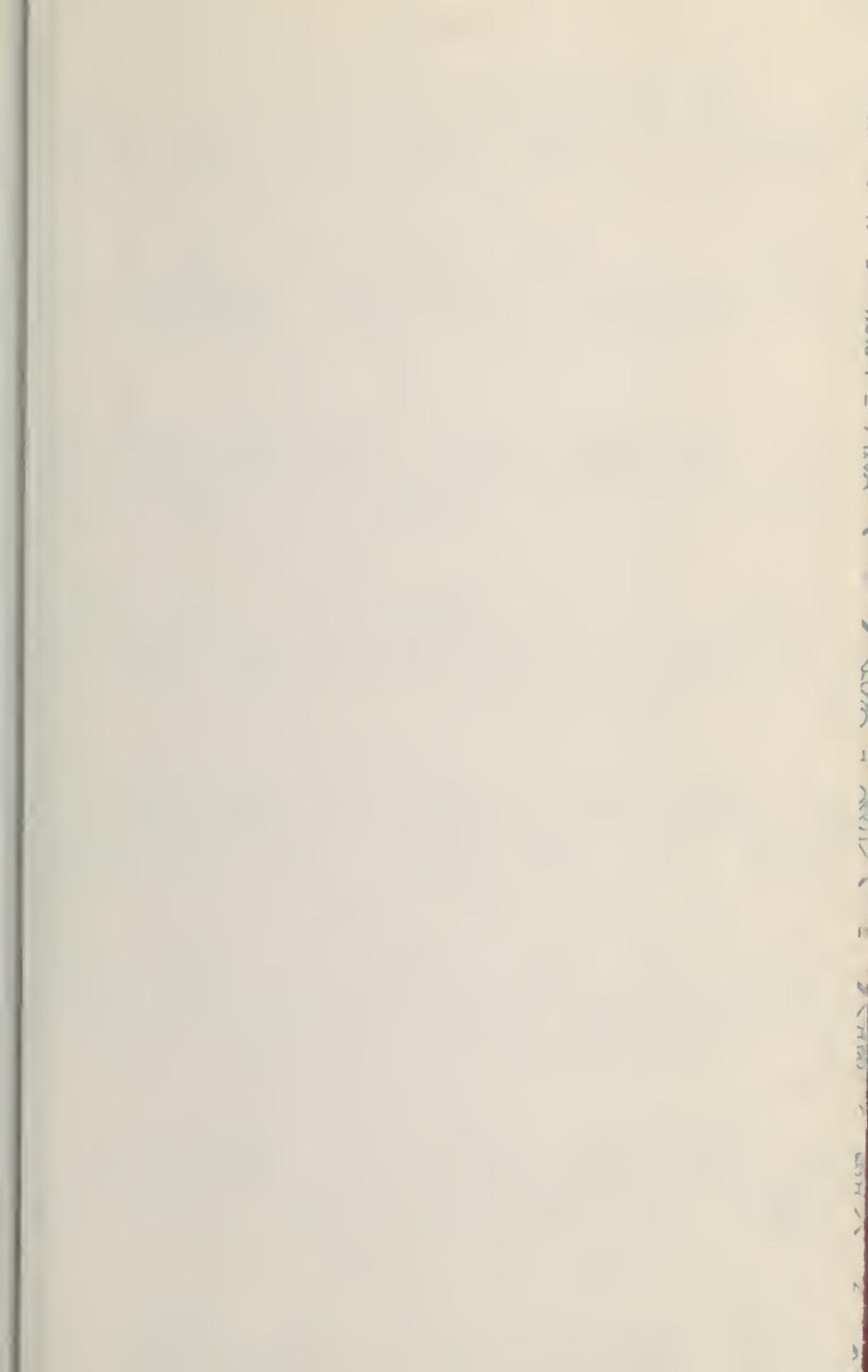
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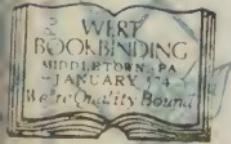
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